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The terrestrial isopods (Isopoda: Oniscidea) of Greece. 24th contribution: The genus *Armadillidium* (Armadillidiidae) on the Aegean islands[1]

Helmut Schmalfuss

Abstract

Based on the investigation of new collections and on a survey of the literature, 13 species of *Armadillidium* are reported from the Aegean islands. Six of them occur also on the Peloponnese and are treated in the previous contribution on that region. For the remaining seven species the diagnostic characters are described and illustrated, the majority by SEM-photographs, and the Greek records are mapped. *A. aeginense* Strouhal, 1939 is shown to be a **new synonym** of *A. argolicum* Verhoeff, 1907. The morphology of the mandibles in *Armadillidium* is documented by SEM-photographs for three species from different species-groups.
Keywords: Isopoda, Oniscidea, *Armadillidium*, Aegean Islands.

Zusammenfassung

Die Untersuchung neuer Aufsammlungen und die Durchsicht der Literatur ergaben 13 *Armadillidium*-Arten von den ägäischen Inseln. Sechs dieser Arten kommen auch auf der Peloponnes vor und wurden im vorhergehenden Beitrag über diese Region behandelt. Die diagnostischen Merkmale der restlichen sieben Arten werden beschrieben und illustriert, die meisten mit Hilfe von REM-Aufnahmen, und die griechischen Nachweise dieser Arten werden kartiert. *A. aeginense* Strouhal, 1939 wird als **neues Synonym** von *A. argolicum* Verhoeff, 1907 betrachtet. Die Morphologie der Mandibeln von drei *Armadillidium*-Arten aus verschiedenen Artengruppen wird mit Hilfe von REM-Aufnahmen dokumentiert.

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[1] 23rd contribution see Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 693 (2006).

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1 Introduction

With 50 described species (*A. aeginense* is shown in the present contribution to be a synonym of *A. argolicum*) and certainly further undescribed ones the genus *Armadillidium* is the terrestrial isopod genus with the highest species number in Greece. Accordingly the systematic situation is still more confused than in any other group. To clarify the picture at least to a certain degree I have started a profound revision of the Greek species. Every valid species will be redescribed, with illustrations (mostly SEM-photographs) of the important diagnostic characters. This is possible because in the Stuttgart museum a huge number of samples have been accumulated from all parts of Greece during the past 40 years, with material of most of the often insufficiently described species and of all the species described as new. This material enabled me to give a rather advanced picture of the distribution inside Greece for every treated species. For practical reasons the revision is subdivided according to different regions of Greece. In a first part (Schmalfuss 2006) the 18 species known from the Peloponnese were worked up, including the descriptions of five new species. Additionally a list of all nominal species ever recorded from Greece was presented, as well as a definition of the genus and a discussion of the diagnostic characters inside the genus.

In the present contribution the species of the Aegean islands are dealt with. There are 13 species known from this region, six of which are also present on the Peloponnese and thus were treated in the first part.

Abbreviations

A.	*Armadillidium*
ex.	example(s), specimen(s)
SMNS	Staatliches Museum für Naturkunde Stuttgart
ZSM	Zoologische Staatssammlung München

Acknowledgments

The following persons have donated isopod material used in this revision: Prof. Dr. D. Ammermann (Tübingen/Germany), Dr. W. Bils (Tübingen/Germany), Dr. F. Erhard (Enzklösterle/Germany), M. Grabert (SMNS), Dr. D. Grimm (Boston/USA), Dr. R. Grimm (Tübingen/Germany), Dr. V. Haas (Munich/Germany), Prof. Dr. R. Kinzelbach (Rostock/Germany), Dr. E. Kohler (Schwäbisch Hall/Germany), Prof. Dr. W. Kühnelt † (Vienna/Austria), Dr. A. Kwet (SMNS), D. Liebegott † (Frankfurt a. M./Germany), Dr. P. Lymberakis (Iraklio/Greece), Dr. H. Malicky (Lunz am See/Austria), I. Maurer (Plochingen/Germany), Dr. G. Osella (L'Aquila/Italy), Dr. H. Pieper (Kiel/Germany), Dr. W. Rähle (Tübingen/Germany), Dr. C. Rieger (Nürtingen/Germany), O. Runze (Kiel/Ger-

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Dr. K. WOLF-SCHWENNINGER and S. LEIDENROTH (both SMNS) operated the scanning electron microscope, and J. REIBNITZ and Dr. H.-P. TSCHORSNIG (both SMNS) edited the SEM-photographs and the maps.

To all of them I wish to express my sincere thanks.

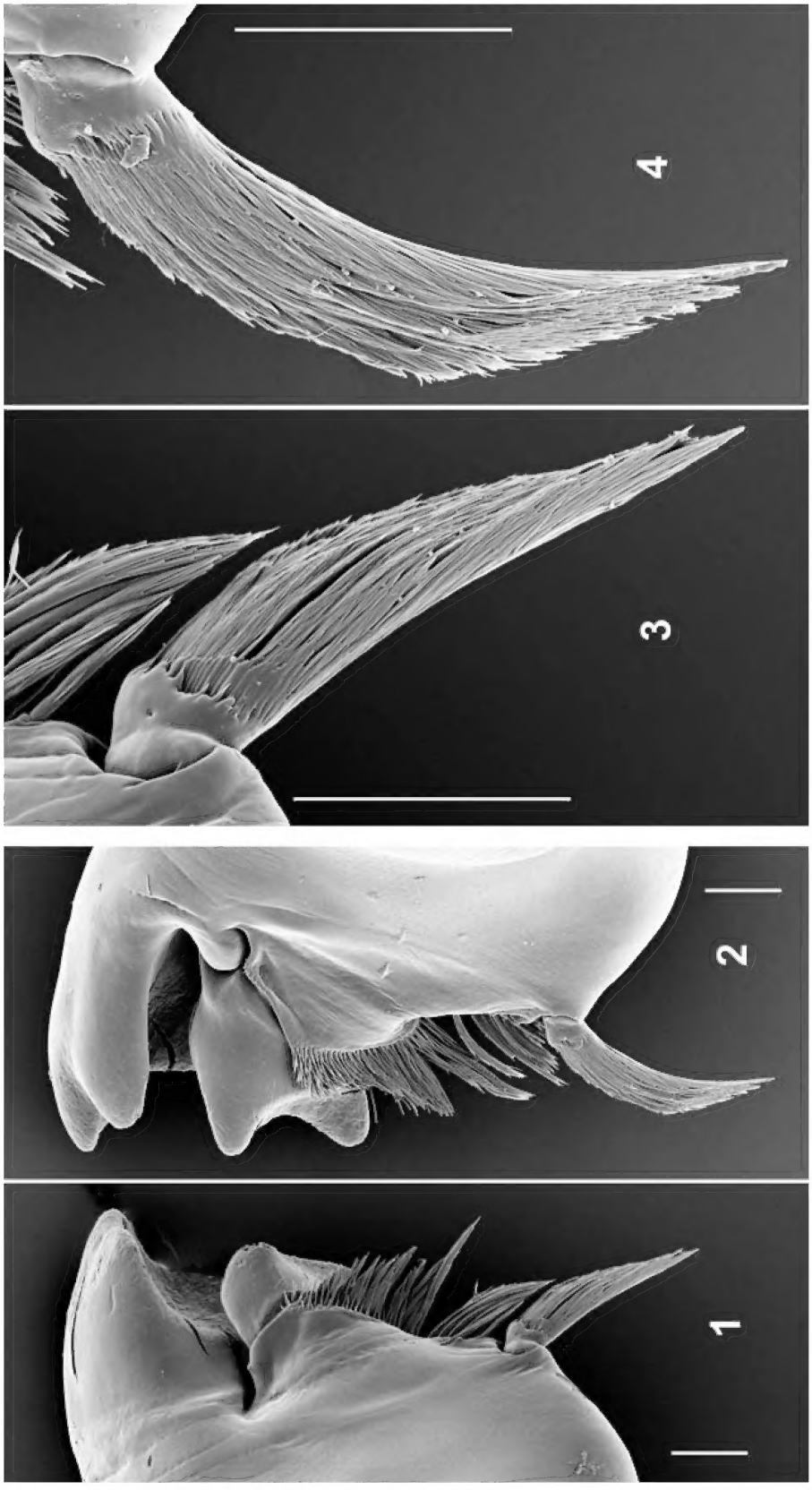
2 Methods

The material used for the SEM-preparations was, if not otherwise stated, air-dried. The mounted material was coated with a 20 nm Au/Pd layer and examined with an ISI-SS40 scanning electron microscope at 10 KV. Digital photographs were directly acquired by using DISS 5 (point electronic).

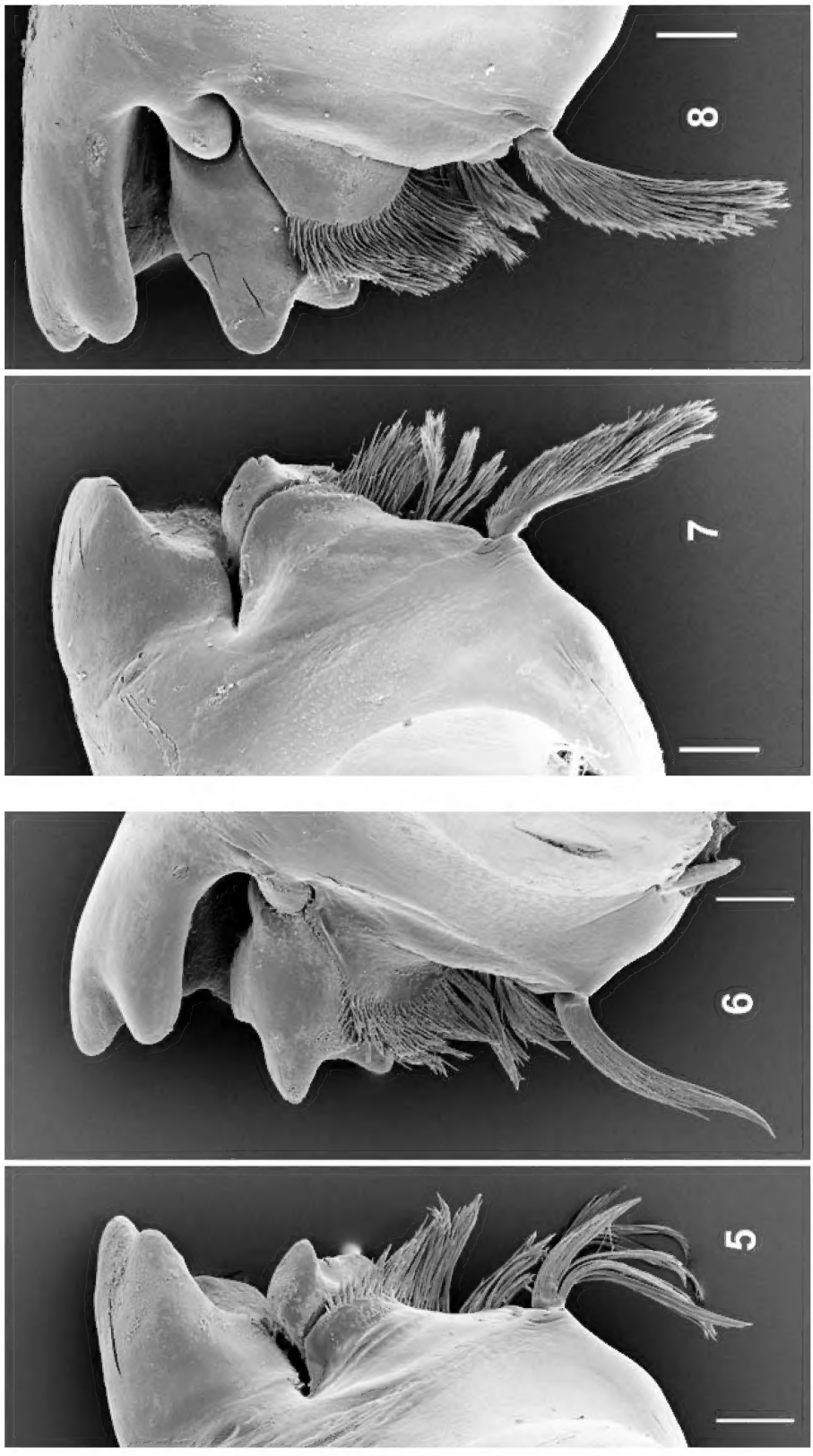
3 The mandibles in *Armadillidium*

The mouth parts have not been found to differ significantly inside the genus *Armadillidium*. This means that all the species of this genus have very similar nutritional strategies. Nevertheless it seems worthwhile to have a closer look to these appendages, and the present series of publications on the genus offers the possibility to do this step by step.

The mandibles are the main cutting organs in terrestrial isopods. They are always asymmetric, the left one being the bigger and stronger partner. The distal part of the appendage consists of a strongly sclerotized *pars incisiva* forming a three-pointed cutting tooth, a *lacinia mobilis* (connected with a joint to the main body of the mandible) which is much bigger on the left side, and three brush-like groups of setae. This distal armature is depicted on SEM-photographs for *A. vulgare* (Figs. 1–4, otherwise treated in the previous contribution) and two of the species treated in the present paper (Figs. 5–8). I chose species of different phyletic lines: *A. vulgare* of the *vulgare*-group, *A. peraccae* of the *nasatum*-group, and *A. ameglioi* which is a somewhat aberrant eastern species. A comparison of these three species and of *A. quinquepustulatum* depicted in SCHMIDT (2003: 157, fig. 165) shows that the mandibular armature is practically identical in all four species. Furthermore it is very similar to the mandible of *Porcellio* (compare SCHMIDT 2003: 150, fig. 159). The conclusion is that these species should have a very similar way of handling their food materials. The bulk of the ingested food consists of dead plant material in a certain state of decay which is cut into pieces and swallowed. It should be mentioned that the decisive components of the food are not the walls of the plant cells consisting of cellulose, but the overgrowth of bacteria and fungi. In the stomach there are combs and brushes scratching this overgrowth from the dead plant material and transporting these essential components of the food into the hepatopancreas, where they are digested while the leaf pieces are egested unaltered. For publications on feeding ecology see bibliographies of *Porcellio scaber* and *Armadillidium vulgare* in SCHMALFUSS (2003).



Figs. 1–4. *Armadillidium vulgare*, ♀, 16 mm long. – **1.** Distal part of right mandible. **2.** Distal part of left mandible. **3.** Ventral brush ("pars molaris") of right mandible. **4.** Ventral brush of left mandible. – Scales: 0.1 mm.



Figs. 5–8. Distal parts of right (5, 7) and left (6, 8) mandibles. – **5–6**. *Armadillidium peraccae*, ♀, 16 mm long (Greece, northern Aegean island Thásos, SMNS 2647). – **7–8**. *A. ameglioi*, ♀, 19 mm long (Greece, island Ródos, SMNS 2322). – Scales: 0.1 mm.

4 The genus *Armadillidium* on the Aegean islands

Up to now 13 species of *Armadillidium* have been recorded from the islands of the Aegean Sea. Six species occur also on the Peloponnese, so they have been treated in the previous contribution (Schmalfuss 2006). Two species are island endemics, *A. cythereium* on Kíthira and Antikíthira, and *A. lymberakisi* in the alpine zone of the Lefká Óri mountains on Crete. Some species show a conspicuous geographical variability (*A. ameglioi*, *A. insulanum*), so further research may lead to a splitting up into a number of more restricted specific taxa and thus to a higher number of island endemics.

4.1 *Armadillidium aegaeum* Strouhal, 1929
(Figs. 9–18 and map Fig. 19)

Literature records

Strouhal 1929a: 102, figs. 42–45 (GR, Northern Sporades, islands Skíros and Skópelos, from the latter as *A.* spec.); Schmalfuss 1981a: 17 (GR, Northern Sporades, islands Alónisos, Gáidaros, Kórakas, Skántzura, Lekhúsa, Kirá Panagiá, Pappús, Giúra).

Material examined

Greece: A number of samples from the Northern Sporades, published in Schmalfuss (1981a), from the islands Alónisos (SMNS 1109, 1129), Gáidaros (SMNS 1104, 1127), Kórakas (SMNS 1105), Skántzura (SMNS 1122), Lekhúsa (SMNS 1117), Kirá Panagiá (SMNS 1102), Giúra (SMNS 1118) and Pappús (SMNS 1110) were re-examined to assure a correct identification. — Further unpublished material: 2 ex., Northern Sporades, island Skópelos, Glóssa, leg. Liebegott, 6.VI.1980 (SMNS 1345). – 1 ex., Northern Sporades, island Alónisos, leg. Liebegott, 23.V.1977 (SMNS 1775). – 7 juv. (?*aegaeum*), Northern Sporades, island Adelfópulo, leg. Liebegott, 3.VI.1981 (SMNS 1444). – 1 ex., Northern Sporades, island Pipéri, leg. Liebegott, 8.VI.1981 (SMNS 1445). – 2 ex., Northern Sporades, island Skíros, "Atsitsa", leg. Liebegott, 23.V.1985 (SMNS 2124). – 8 ex., Northern Sporades, islet Sarakinó SE of island Skíros, leg. Liebegott, 17.V.1885 (SMNS 2122). – 4 ex., northern Évvia, Kandílio Mountains, leg. Kühnelt, 8.IV.1972 (SMNS 1812). – 7 ex. (?*aegaeum*), Évvia, N of Psakhná, Ágios-Pass, 700 m, *Pinus*, *Juniperus*, leg. Schmalfuss, 4.X.2000 (SMNS 2662).

Diagnostic characters

Maximum dimensions: 17.0 × 7.3 mm.

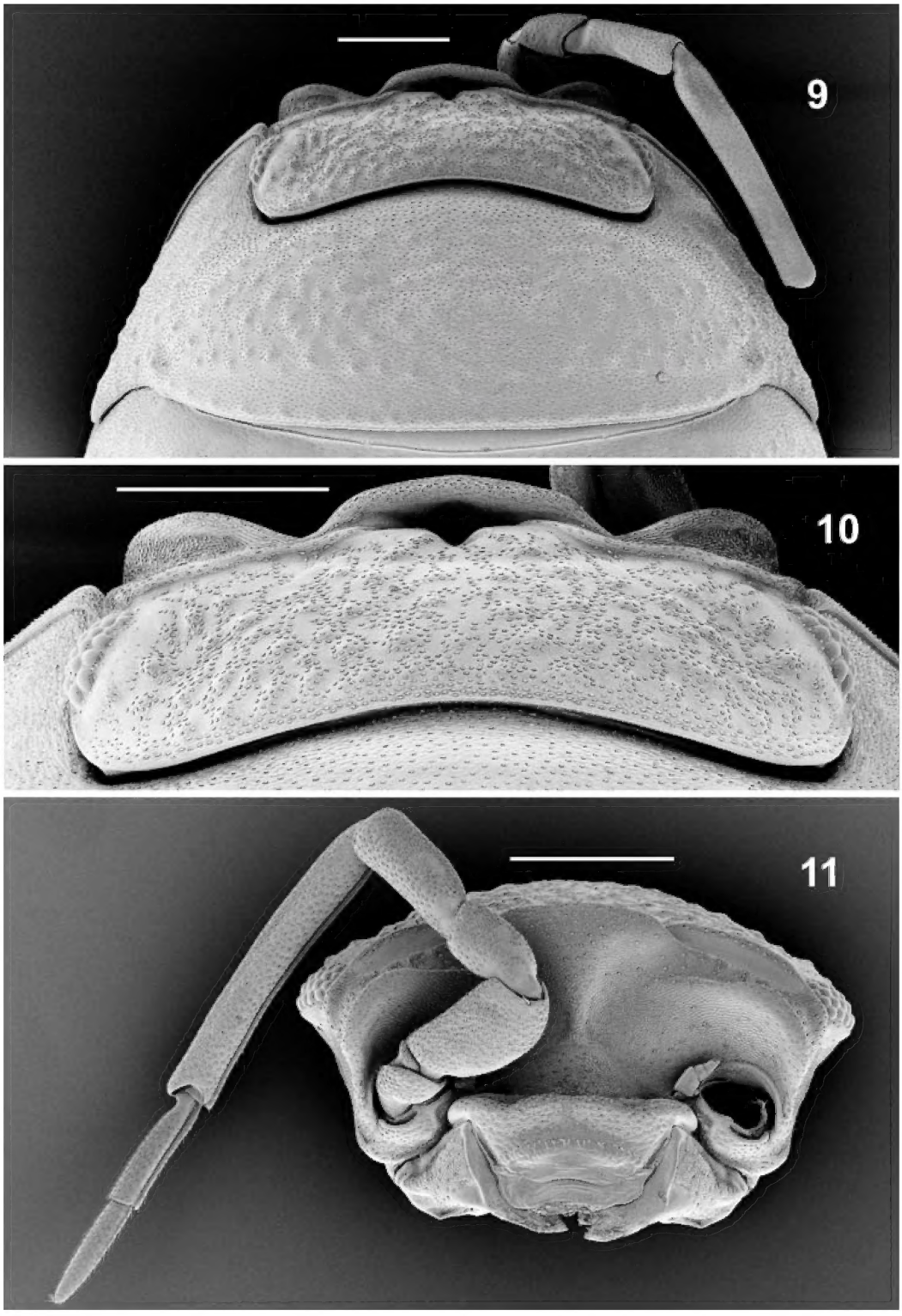
Coloration: Dark grey, yellowish brown or completely without pigmentation. It seems that the populations living on small uninhabited islands tend to reduce pigmentation, the reasons for these differences are as yet unknown.

Cuticular structures: Tergites variable, smooth to conspicuously granulated.

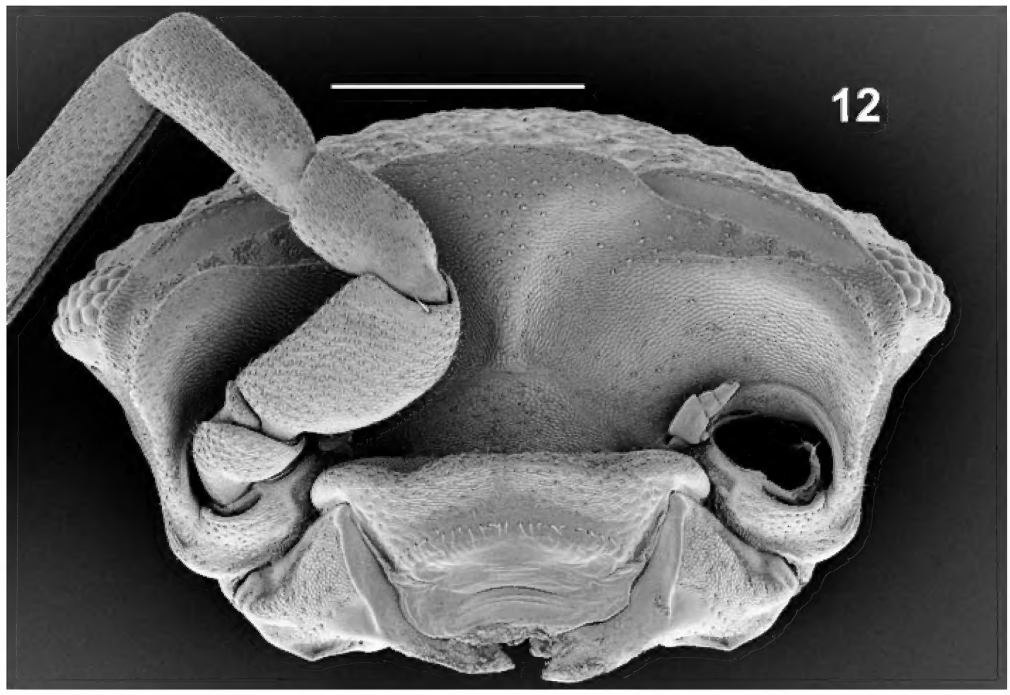
Frontal shield from behind surpassing frontal margin of head, upper margin completely rounded, no angles laterally, caudally with conspicuous groove (Figs. 9–10); antennal lobes trapezoidal (Fig. 12). Hind margin of pereion-epimeron 1 with very obtuse angle (Fig. 13). Telson as wide as long, with nearly straight sides and rounded apex (Fig. 14). Antenna see Fig. 11, segments of the flagellum more or less the same length. Male carpus 1 with brush of short spines (Fig. 15); male ischium 7 ventrally concave, frontally with distal and ventral hair-fields (Figs. 16–17). Male pleopod-exopodite 1 with short triangular hind-lobe (Fig. 18), endopodite 1 with apex straight.

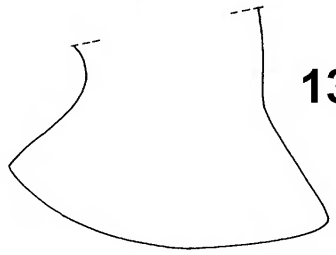
Distribution

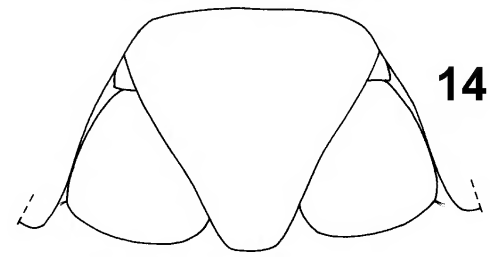
Greece: Northern Sporades (including the Skíros archipelago) and Évvia (see map Fig. 19).

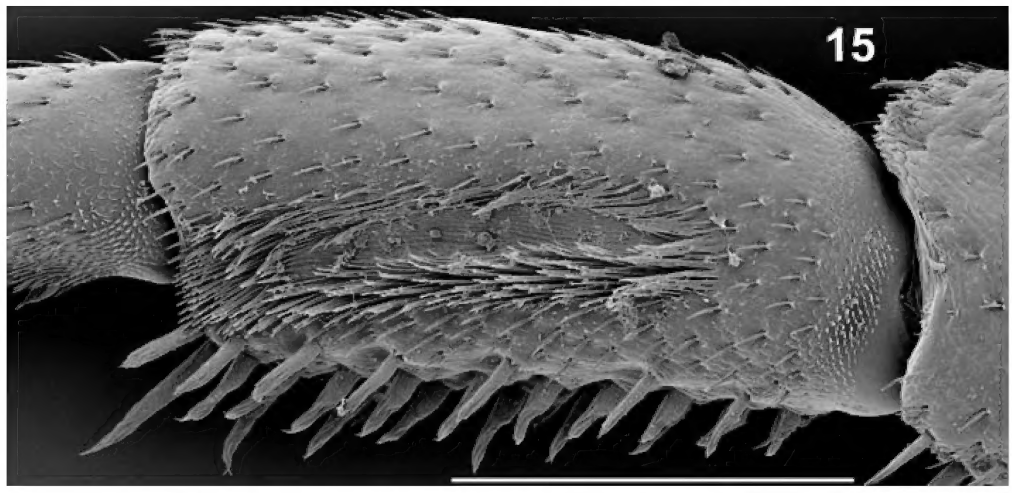


Figs. 9–11. *Armadillidium aegaeum* (Greece, Northern Sporades, SMNS 1104). – **9.** ♀, 17 mm long, head and pereion-tergite 1 in dorsal view. **10.** ♀, 17 mm long, head in dorsal view. **11.** ♀, 14 mm long, head with right antenna in frontal view. – Scales: 1 mm.

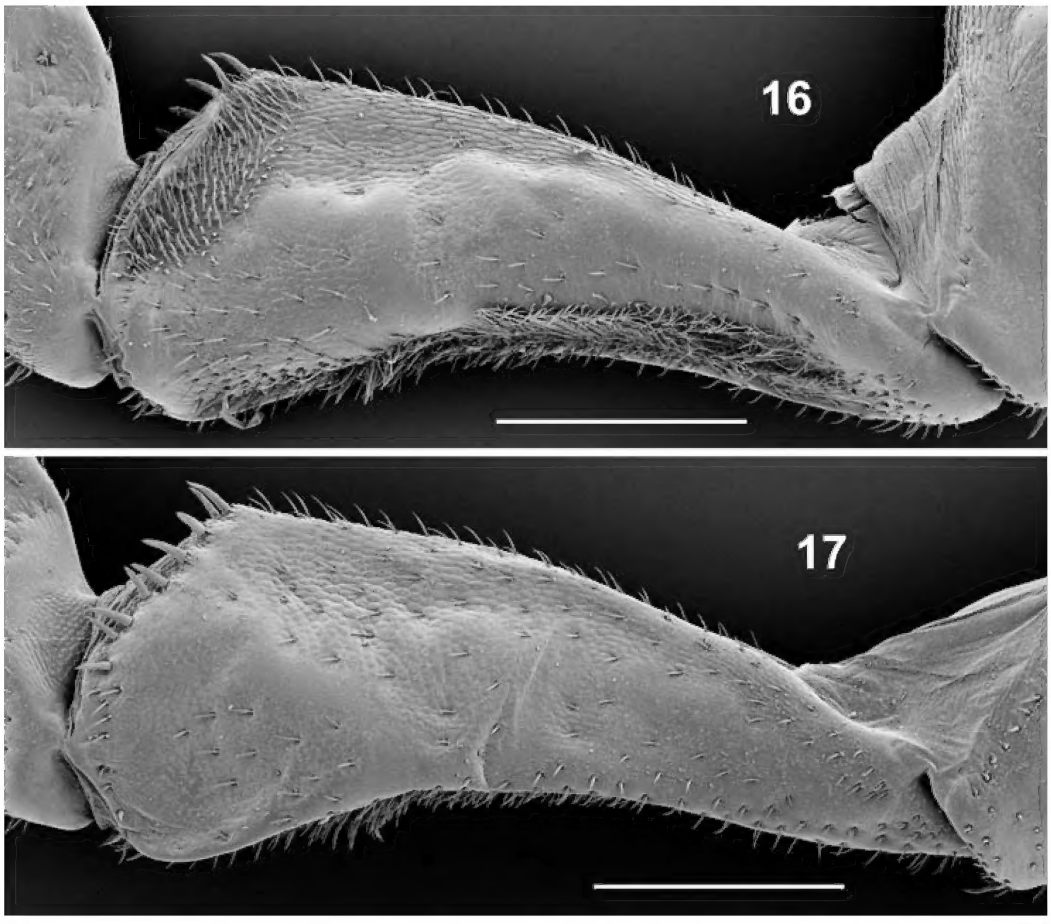


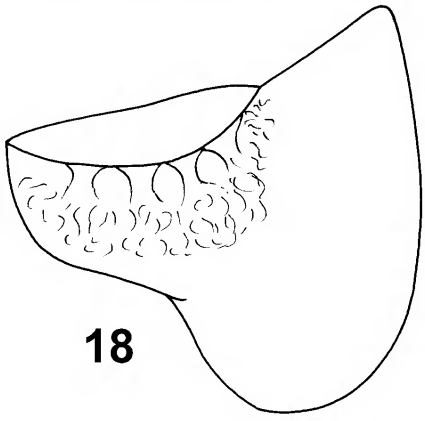






Figs. 12–15. *Armadillidium aegaeum* (Greece, Northern Sporades). – **12**. ♀, 17 mm long (SMNS 1104), head in frontal view. **13**. ♂, 13.5 mm long (SMNS 1110), pereion-epimeron 1, dorsolateral view. **14**. ♂, 13.5 mm long (SMNS 1110), telson and uropods in dorsal view. **15**. ♂, 17 mm long (SMNS 1110), carpus 1, frontal view. – Scales: 1 mm (12), 0.5 mm (15).





Figs. 16–18. *Armadillidium aegaeum*, ♂, 17 mm long (Greece, Northern Sporades, SMNS 1110). – **16**. Ischium 7, frontal view. **17**. Ischium 7, caudal view. **18**. Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm.

Remarks

The species shows similarities with *A. argolicum* concerning the structure of the head, but differs from this species conspicuously by the characters of the male ischium 7. The separation of *A. aegaeum* and *A. insulanum* is delicate, the former is big-

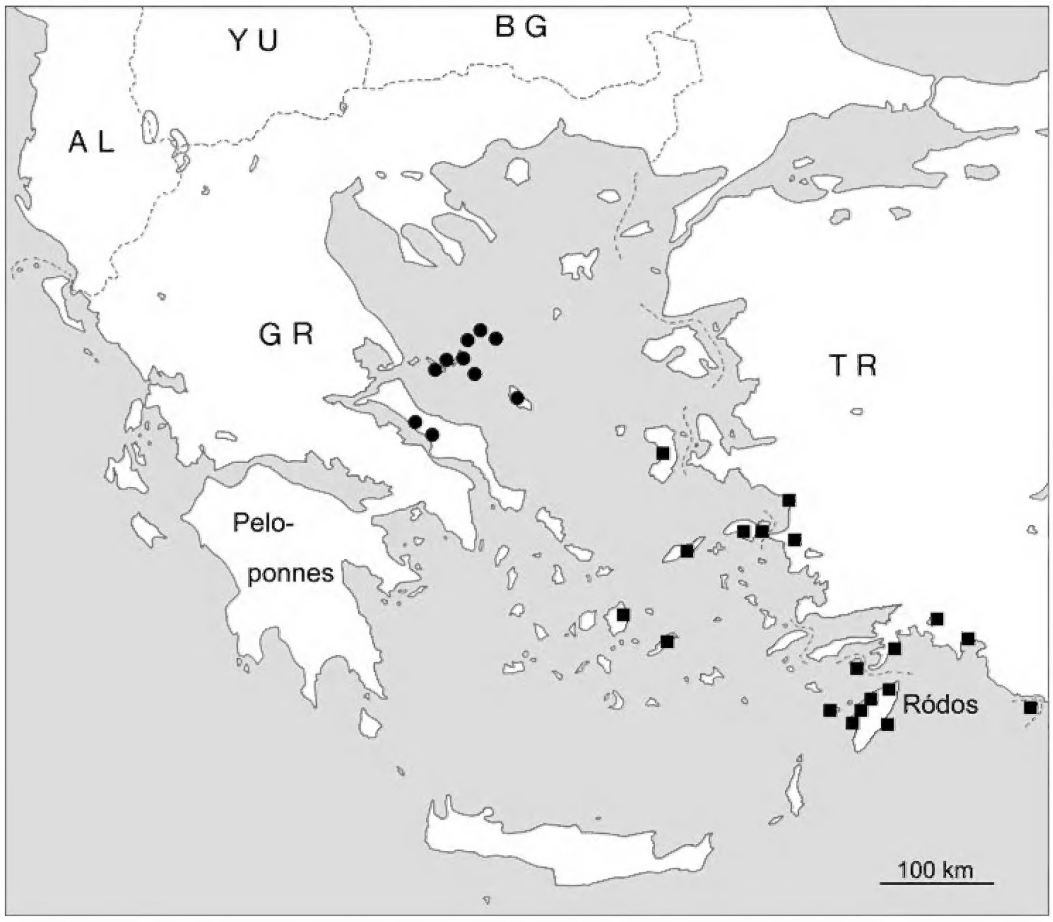


Fig. 19. Records of *Armadillidium aegaeum* (●) and of *A. ameglioi* (■). – The latter species has also been recorded further east from the region of Antalya.

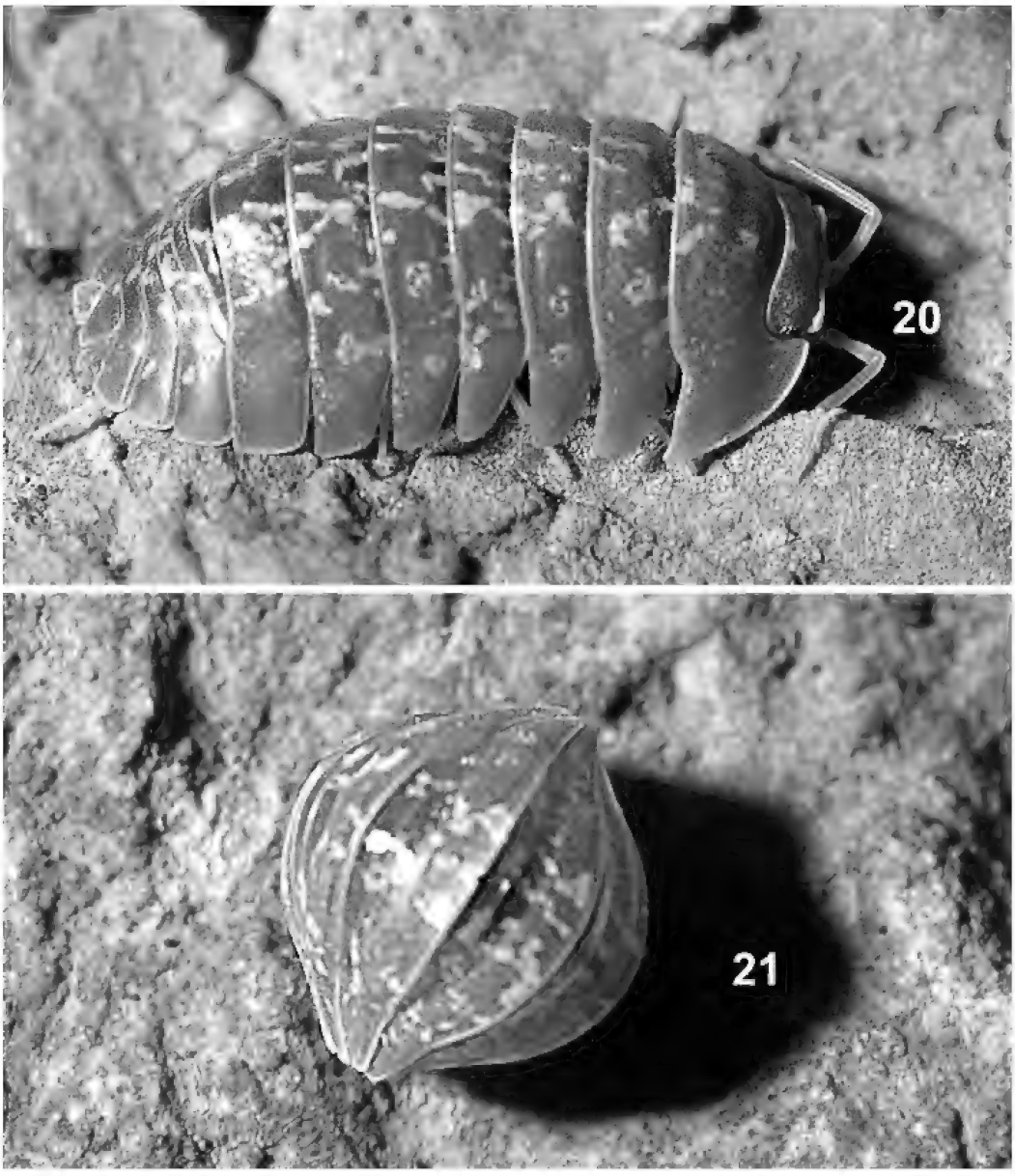
ger and has a more uniform light color; adult males show unambiguous differences in the structure of the ischium 7 (in *A. aegaeum* the adult male ischium possesses ventrally a band of dense setae, which is never present in *A. insulanum*, compare Figs. 16 and 68), but juvenile males of *A. aegaeum* can be mistaken for *A. insulanum*.

4.2 *Armadillidium ameglioi* Arcangeli, 1914
(Figs. 7–8, 20–37 and map Fig. 19)

Synonyms: *A. ephesiacum* Strouhal, 1927, *A. samium* Strouhal, 1929.

Literature records

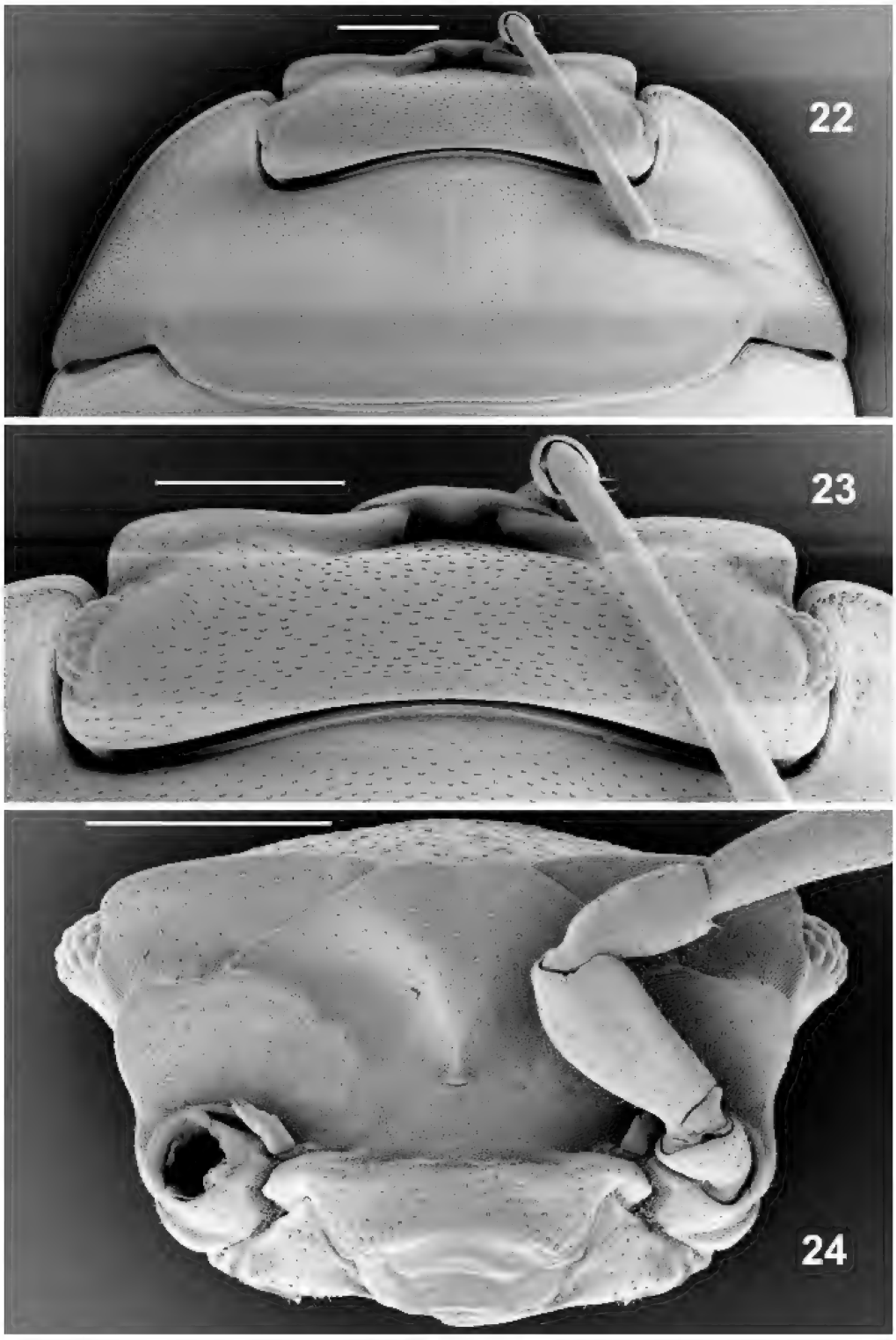
Arcangeli 1914: 1, figs. 1–3 (GR, Aegean island Ródos); Arcangeli 1934: 38 (subgenus *Catatrigonium*); Strouhal 1927: 16, figs. 1–5 (*A. ephesiacum*, western Turkey, Ephesos); Strouhal 1929b: 56, figs. 19–22 (*A. samium*, GR, Aegean island Sámos); Strouhal 1937a: 246 (GR, island Ródos); Schmalfuss 1972: 595, figs. 70–71 (GR, island Ródos); Schmalfuss 1999: 6 (GR, island Kastelórizo 130 km E of Ródos); Sfenthourakis 1994: 126, figs. 89–92 (GR, Aegean islands Náxos, Amorgós, Ikaría, Alatonísi, Sámos, Khálki).



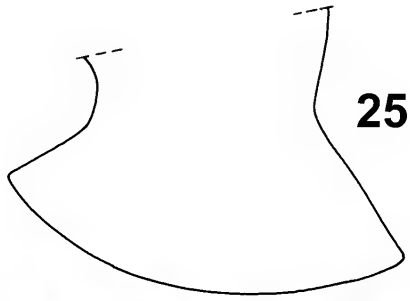
Figs. 20–21. *Armadillidium ameglioi*, live animal from Ródos island, walking (20) and rolled up, forming a lemon-shaped structure (21).

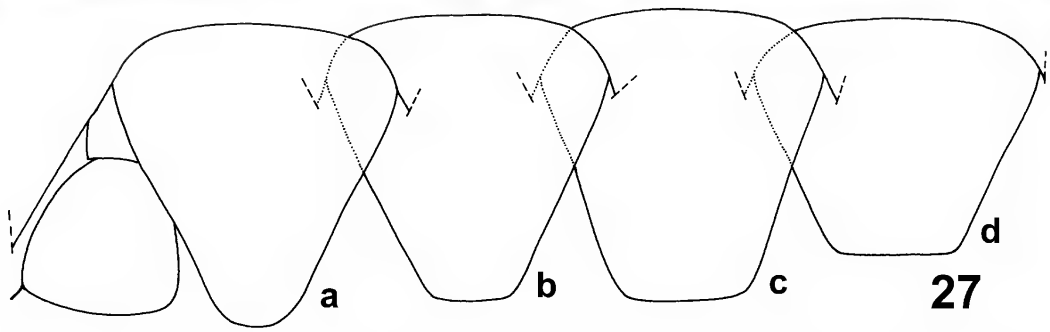
Material examined

Greece: 2 ex., Aegean island Náxos, Liónas, leg. Mylonas, 8.XII.1979 (SMNS 2248). – 2 ex., Aegean island Khíos, Anávatos, leg. Malicky, 18.V.1975 (SMNS 1759). – 1 ex., Aegean island Khíos, "spring Raldis Brondados", leg. Deeleman, 16.II.1982 (SMNS 2138). – 1 ex., Aegean island Sámos, Pithagório, leg. Deeleman, 10.IV.1983 (SMNS 2252). – 2 ex., Aegean island Símí N of Ródos, leg. Schmalfuss, 14.V.1976 (SMNS 1664). – 2 ex., Aegean island Khálki W of Ródos, leg. Liebegott, 7.IV.1982 (SMNS 1452). – 36 ex., Aegean island Ródos, coast to 800 m, leg. Schawaller, IV.1980 (SMNS 1146, 1148, 1151, 1154), leg. Pauli & Schmalfuss, IV.1981 (SMNS 1379, 1383, 1389), leg. Schmalfuss, IV.1992 and IV.1998 (SMNS 2322, 2643). – 20 ex., island Kastelórizo 130 km E of Ródos, leg. Liebegott, 14.V.1983 and leg. Schmalfuss, 30.IV.1992 (SMNS 1991, 2319).



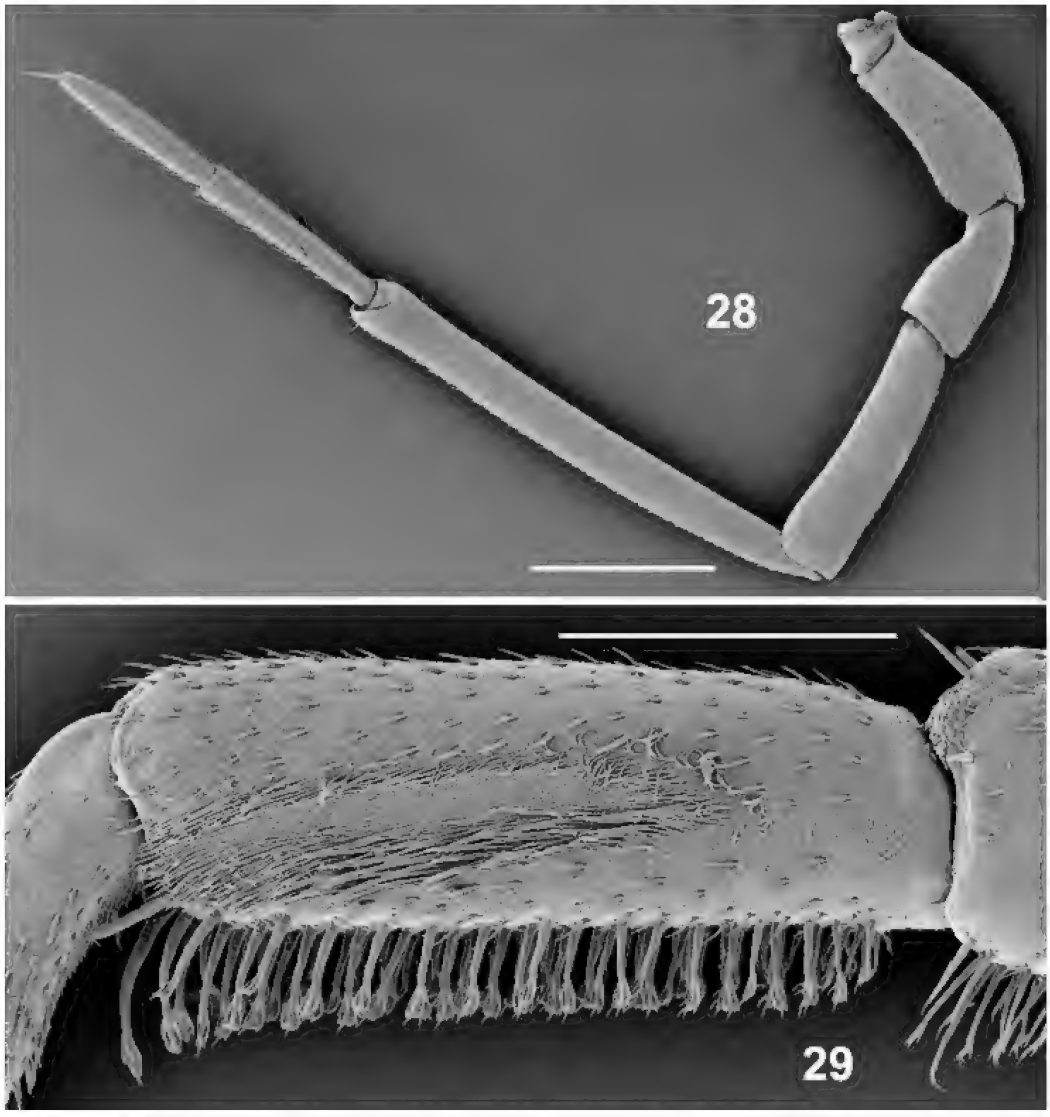
Figs. 22–24. *Armadillidium ameglioi* (Greece, island Ródos, SMNS 1146). – **22**. ♂, 18 mm long, head and pereion-tergite 1 in dorsal view. **23**. ♂, 18 mm long, head in dorsal view. **24**. ♂, 15 mm long, head in frontal view. – Scales: 1 mm.





Figs. 25–27. *Armadillidium ameglioi*. – **25**. ♂, 18 mm long (island Ródos, SMNS 1146), pereion-epimeron 1 in dorsolateral view. **26**. ♂, 15 mm long (island Ródos, SMNS 1146, critical point dried), pleon, ventral view. **27**. Geographic variability of telson shape: (a) southeastern Aegean island Ródos (SMNS 1146); (b) southeastern Aegean island Símí (SMNS 1664); (c) western Turkish mainland, Izmir (SMNS 11033); (d) southwestern Turkish mainland, Muğla (SMNS 11044). – Scale: 1 mm.

SW-Turkey: 5 ex., Izmir, Efes, leg. KINZELBACH et al., 5.III.1977 (SMNS 11033). – 1 ex., 15 km SE of Söke, Priene, leg. PIEPER, 10.XI.2004 (SMNS 1556). – 1 ex., district Muğla, S of Mamaris, Daracya, leg. SCHÖNFELD, X.2002 (SMNS 11544). – 12 ex., district Muğla, 7 km E of Dalaman, leg. KINZELBACH et al., 6.III.1977 (SMNS 11035). – 46 ex., district Muğla, Köyceğiz,



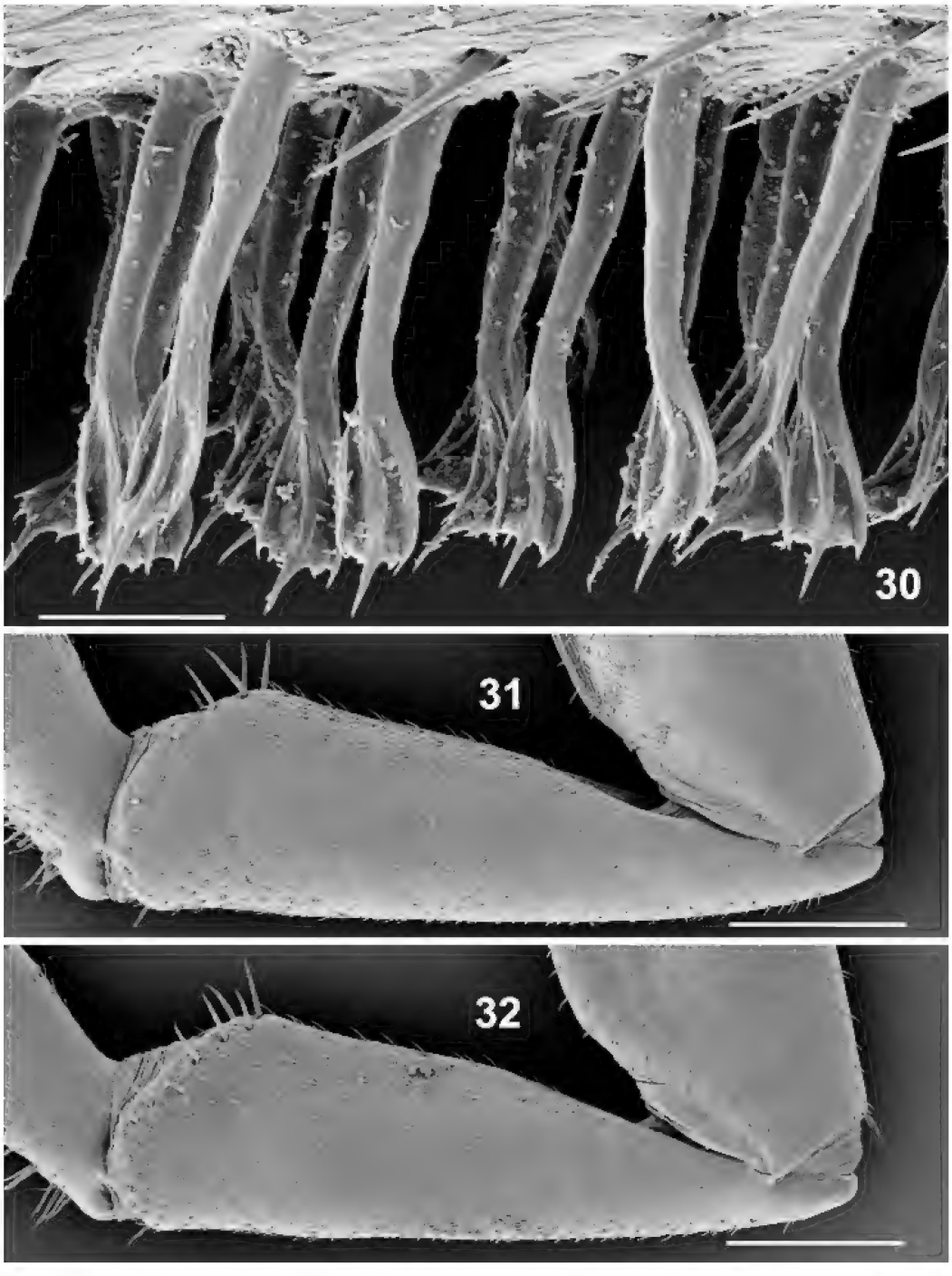
Figs. 28–29. *Armadillidium ameglioi*, ♂, 18 mm long (island Ródos, SMNS 1146). – **28**. Antenna. **29**. Carpus 1, frontal view. – Scales: 1 mm (28), 0.5 mm (29).

harbor, leg. Scheuern, 6.III.1977 (SMNS 11044, 11046). – 2 ex., 50 km S of Antalya, leg. Scheuern, 25.X.1996 (SMNS 11526). – 4 ex., 60 km S of Antalya, SW of ruins of ancient Olympos, leg. Rähle, 1.X.1986 (SMNS 11221) and leg. Scheuern, 18.X.1996 (SMNS 11516). – 2 ex., 20 km W of Antalya, above Çakilar, 700 m, leg. Rähle, 30.IX.1986 (SMNS 11224). – 6 ex., 30 km NNW of Antalya, 7 km N of Yeniköy, Öküzini, 300 m, leg. Rähle, 21.III.1986 (SMNS 11317). – 5 ex., Antalya, old harbor, leg. Rähle, 23.III.1986 (SMNS 11216).

Diagnostic characters

Maximum dimensions: 22 × 12 mm (♀ from Khíos).

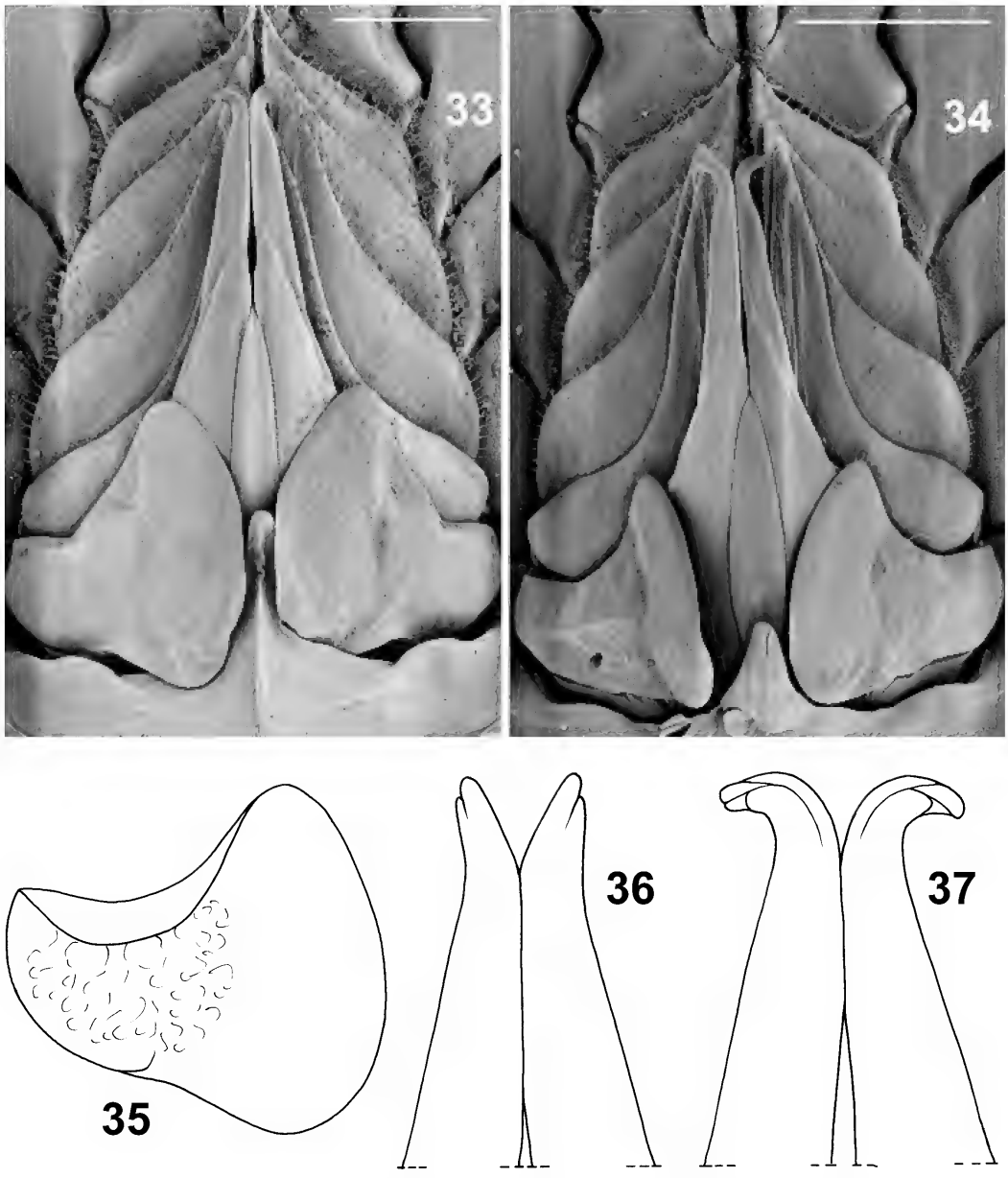
Coloration: Light brown or grey, with dark markings at the hind margins of the tergites. Some samples are entirely yellowish without any dark pigmentation (e. g. from Profítis Ilías on Ródos, Khálki), others are bright reddish brown with yellow markings (eastern part of Ródos, Figs. 20–21).



Figs. 30–32. *Armadillidium ameglioi*, ♂, 18 mm long (island Ródos, SMNS 1146). – **30**. Detail of ventral brush on carpus 1. **31**. Ischium 7, frontal view. **32**. Ischium 7, caudal view. – Scales: 0.05 mm (30), 0.5 mm (31, 32).

Cuticular structures: Tergites smooth to slightly granulated.

"Pseudospheric" species, epimera less steep, rolled-up animal thus forming a lemon-shaped ball (Fig. 21). Frontal triangle with a narrow upper part surpassing



Figs. 33–37. *Armadillidium ameglioi*. – **33**. ♂, 15 mm long (island Ródos, SMNS 1146), pleopods in situ, ventral view. **34**. ♂, 18 mm long (island Ródos, SMNS 1146), pleopods in situ, ventral view. **35**. ♂, 17 mm long (island Ródos, SMNS 1146), pleopod-exopodite 1, dorsal view. **36**. ♂, 11 mm long (Muğla, SMNS 11044), apices of pleopod-endopodites 1 (juvenile). **37**. ♂, 14.5 mm long (Muğla, SMNS 11044), apices of pleopod-endopodites 1 (adult). – Scales: 1 mm.

frontal margin of head, not higher than the well-developed lateral crests (Figs. 22–23); antennal lobes triangular (Fig. 24). Hind margin of pereion-epimeron 1 with more or less pronounced angle (Fig. 25). Ventral view of pleon see Fig. 26. Telson exhibiting a clinal variability, in specimens from Náxos and Ródos as broad as long with broadly rounded apex, on Símí with narrowly truncated apex and on Sá-

mos, Khíos and the mainland of Asia Minor with broadly truncated apex (Fig. 27). Antenna – compared with other species of the genus – slender, distal segment of flagellum slightly shorter than proximal one (Fig. 28). Male carpus 1 with ventral brush of spiny setae with enlarged apices (Figs. 29–30); pereiopod 7 long and slender (correlated with the pseudospheric body shape); male ischium 7 ventrally straight, frontally without distal hair-field, (Figs. 31–32). Male pleopod-exopodite 1 with short, more or less rounded hind-lobe (Figs. 33–35), endopodite 1 with apex bent outwards at a right angle in mature males (Figs. 33–34); depending on size and/or season the apex can have a different shape in males from the same locality, with the tip bent outwards only at a very slight angle (Figs. 36–37).

Distribution

Greece: Aegean islands Khíos, Sámos, Alatsonísi, Ikaría, Náxos, Amorgós, Khálki, Símí, Ródos and the Greek island Kastelórizo 130 km E of Ródos; SW-Turkey (records from Greek islands and Aegean coast of Turkey see Fig. 19, overall distribution map see Schmalfuss 2000: 80, map fig. 7).

Remarks

At the present state of knowledge *A. samium* Strouhal, 1929 and *A. ephesiacum* Strouhal, 1927 are considered as synonyms of *A. ameglioi*, because the investigation of more material from the Aegean islands and Asia Minor has shown that differences are gradual and concern only the shape of the telson (see figs. 89–92 in Sfenthourakis 1994 and Fig. 27). Further detailed investigations including molecular studies may prove *A. ameglioi* to be a sort of superspecies, but then probably every island population will have to be treated as a separate species. As long as these different populations are vicariant and not sympatric it gives a much clearer picture if we treat them under the common name *A. ameglioi* sensu lato.

A. naxium Verhoeff, 1901 from Náxos Island is very probably identical with *A. ameglioi*, but the description is insufficient and the types are lost, so *A. naxium* remains a nomen dubium.

4.3 *Armadillidium argolicum* Verhoeff, 1907

New synonym: *A. aeginense* Strouhal, 1939 (see Remarks below).

This species was treated in the 23rd contribution of this series (*Armadillidium* on the Peloponnese, Schmalfuss 2006). It was up to now known from the northeastern Peloponnese and the adjacent islands Ídra (= Hydra) and Módi E of island Póros.

Additional material examined

Greece: 13 ex., Attica, island Égina, pine forest, leg. Sfenthourakis, 19.V.2006 (SMNS 2231).

Remarks

A comparison of the new material with *A. argolicum* from the island of Ídra (= Hydra) shows that the species described by Strouhal (1939: 253, figs. 1–4) as *A. aeginense* is a junior synonym of *A. argolicum*.

4.4 *Armadillidium atticum* Strouhal, 1929
(Figs. 38–47 and map Fig. 48)

Literature records (all from central Greece)

Strouhal 1929a: 99, figs. 38–41 (near Athens); Strouhal 1937a: 242–244, figs. 37–38 (*A. a. atticum*, *A. a.* var. *brevipes*, *A. a. kythnium*, Évvia: Stení, islands Salamína and Kíthnos); Strouhal 1937b: 108 (island Salamína W of Athens); Strouhal 1937c: 129 (Athens); Strouhal 1938: 39 (?Peloponnese, Kórinthos); Strouhal 1939: 258 (Athens and island Égina); Vandel 1946: 181 (see Remarks); Theodorides 1960: 322 (surroundings of Athens); Schmalfuss 1975: 50 (Athens); Sfenthourakis 1994: 127 (island Kíthnos).

Material examined

Greece: 18 ex., Attica, Pentéli NE of Athens, leg. Kühnelt, 17.IV.1960, and leg. Schmalfuss, 25.III.1967 (SMNS 1707, 1517). – 11 ex., Attica, Athens, Imittós Mountain, leg. Kühnelt, 23.IV.1960 (SMNS 1765), and leg. Schmalfuss, 16.IV.1967 (SMNS 1518, published in Schmalfuss 1975). – 1 ex., Attica, Várkiza S of Athens, leg. Kühnelt, 18.IV.1960 (SMNS 1706). – 6 ex., Attica, Rafína, leg. Kühnelt, 15.IV.1960 (SMNS 1665).

Diagnostic characters

Maximum dimensions: 13.5 × 5.8 mm.

Coloration: Light greyish brown, epimera lighter.

Cuticular structures: Tergites granulated.

Frontal shield from behind surpassing frontal margin of head, about four times as wide as high, laterally with pronounced angles, caudally with conspicuous groove (Figs. 38–39); antennal lobes trapezoidal (Fig. 40). Hind margin of pereion-epimeron 1 rounded (Fig. 41). Telson as wide as long, with nearly straight sides and rounded apex (Fig. 42). Antenna see Fig. 43, distal segment of flagellum slightly longer than proximal one. Male carpus 1 with weakly developed brush of short spines (Fig. 44); male ischium 7 ventrally concave, frontally with a longitudinal distal hair-field (Figs. 45–46). Male pleopod-exopodite 1 with narrow elongated hind-lobe (Fig. 47), endopodite 1 with straight apex.

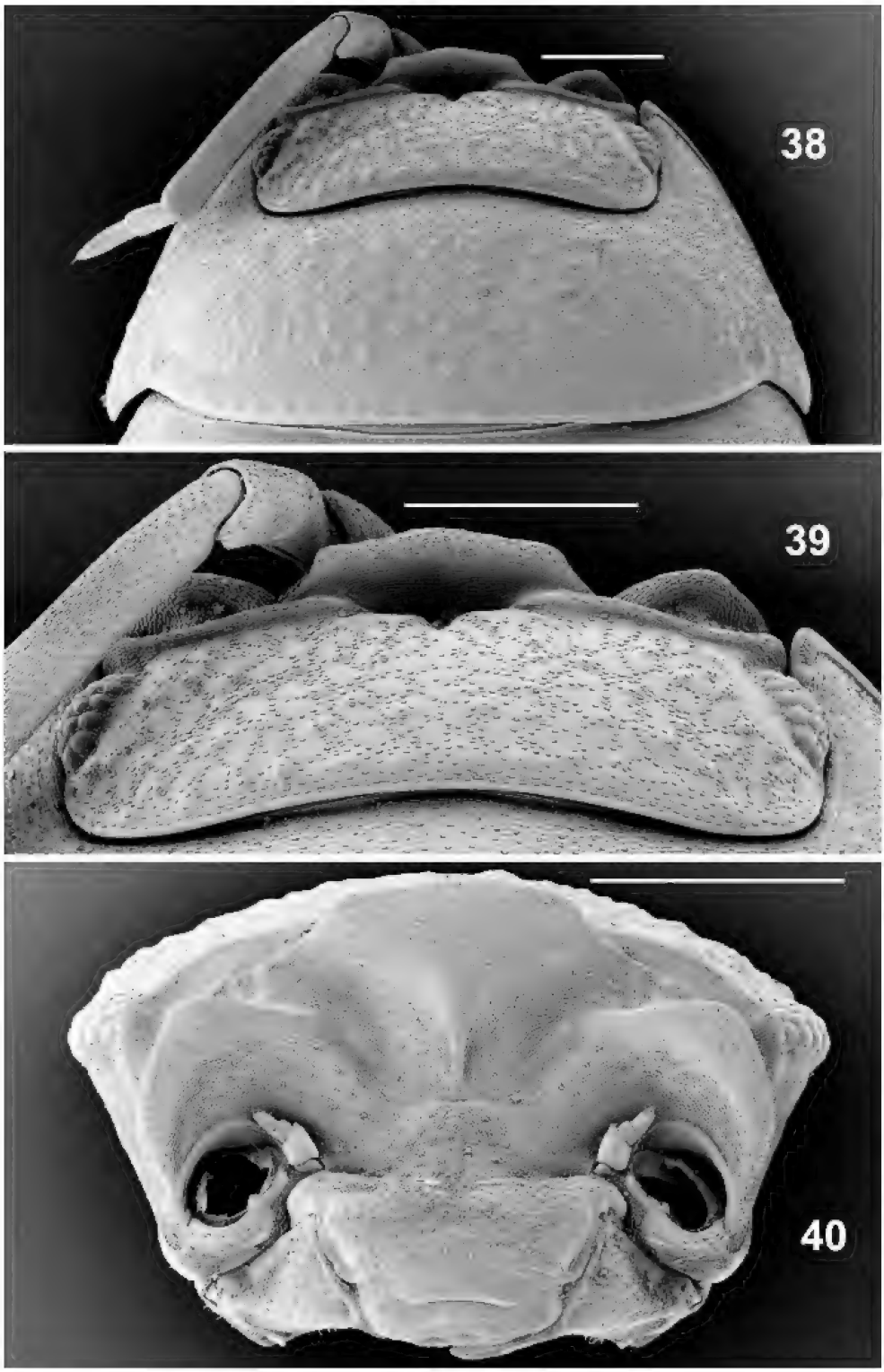
Distribution

Central Greece (Attica) and islands Évvia, Salamína, Égina and Kíthnos (map see Fig. 48).

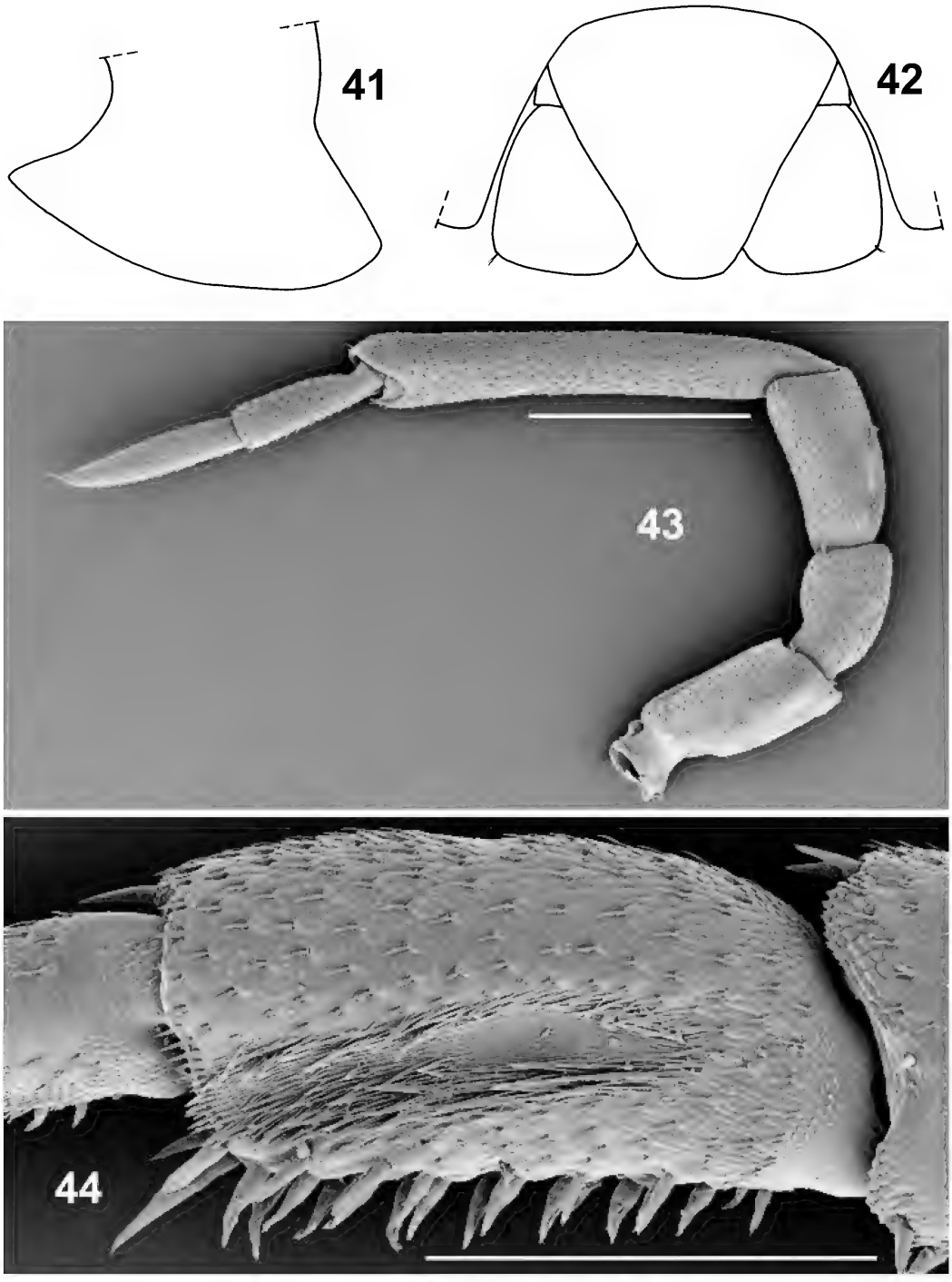
Remarks

This is certainly the sister-species of the *A. insulanum* complex, as Sfenthourakis (1994: 132) suggested. The only consistent difference is the elongated male pleopod-exopodite 1. The different shape is, however, probably correlated with differences in copulation behavior, and thus *A. atticum* should have reached the state of a separate species and not only a subspecies.

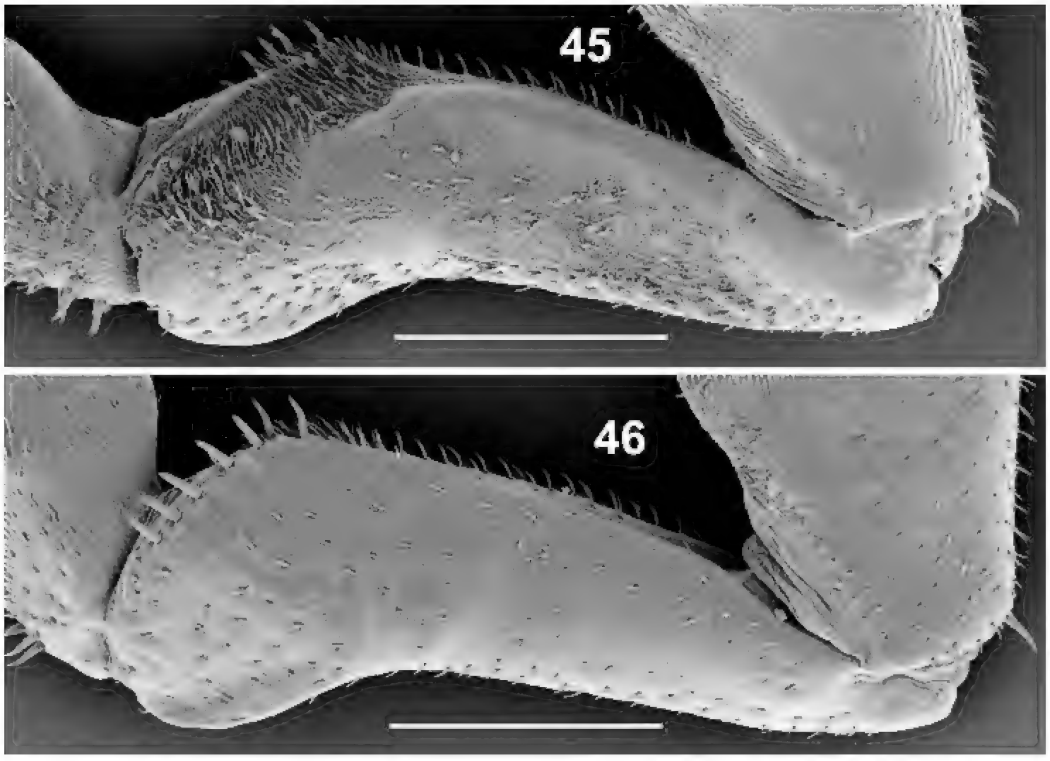
Vandel (1946: 181) reports this species from Metéora (Kalampáka, Thessaly). I have identified samples from the same locality (Schmalfuss 1981b: 281) as *A. corcyraeum*. After a comparison of "true" *A. corcyraeum* from the island Paxí (SMNS 1139), the specimens from Metéora (SMNS 1721, 1843) and the "true" *A. atticum* from Athens (SMNS 1517) I come to the following conclusion: The animals from Metéora may be conspecific with *A. corcyraeum*, but certainly not with *A. atticum*; the specimens are bigger, much less tuberculated, have a different coloration and have the male ischium 7 ventrally straight instead of strongly concave. They also show differences towards the "true" *A. corcyraeum*, which are inside a geographical

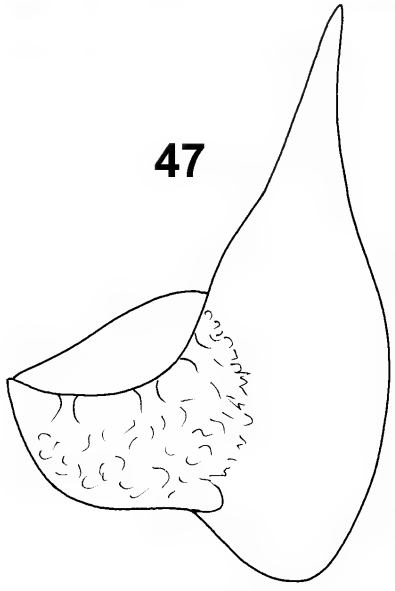


Figs. 38–40. *Armadillidium atticum* (Greece, Athens, SMNS 1518). – **38.** ♂, 13.5 mm long, head and pereion-tergite 1 in dorsal view. **39.** ♂, 13.5 mm long, head in dorsal view. **40.** ♀, 13.5 mm long, head in frontal view. – Scales: 1 mm.



Figs. 41–44. *Armadillidium atticum* (Greece, Athens, SMNS 1518). – **41**. ♀, 13.5 mm long, pereion-epimeron 1, dorsolateral view. **42**. ♀, 13.5 mm long, telson and uropods in situ, dorsal view. **43**. ♂, 13.5 mm long, antenna. **44**. ♂, 13.5 mm long, carpus 1, frontal view. – Scales: 1 mm (43), 0.5 mm (44).





Figs. 45–47. *Armadillidium atticum*, ♂, 13.5 mm long (Greece, Athens, SMNS 1518). – **45**. Ischium 7, frontal view. **46**. Ischium 7, caudal view. **47**. Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm.

intraspecific variability, but which could also mean a separation on the species level. A solution of this question will depend on further collections between Metéora and Ionian islands.

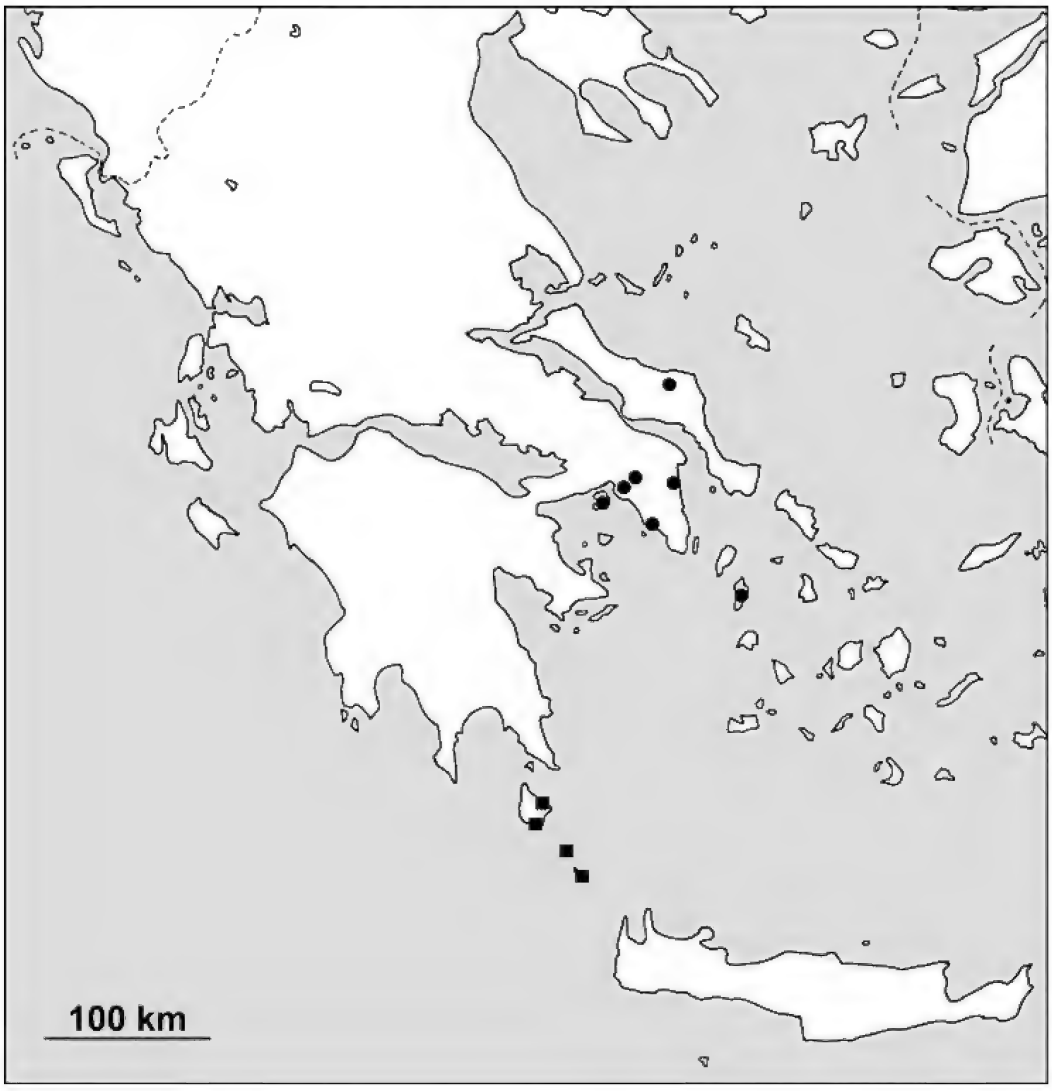


Fig. 48. Records of *Armadillidium atticum* (●) and *A. cythereium* (■).

4.5 *Armadillidium bicurvatum* Verhoeff, 1901

This species was treated in the 23rd contribution of this series (*Armadillidium* on the Peloponnese, SCHMALFUSS 2006). It is known from the western parts of Greece from the Ípiros to western Crete and has also been found in southern Albania.

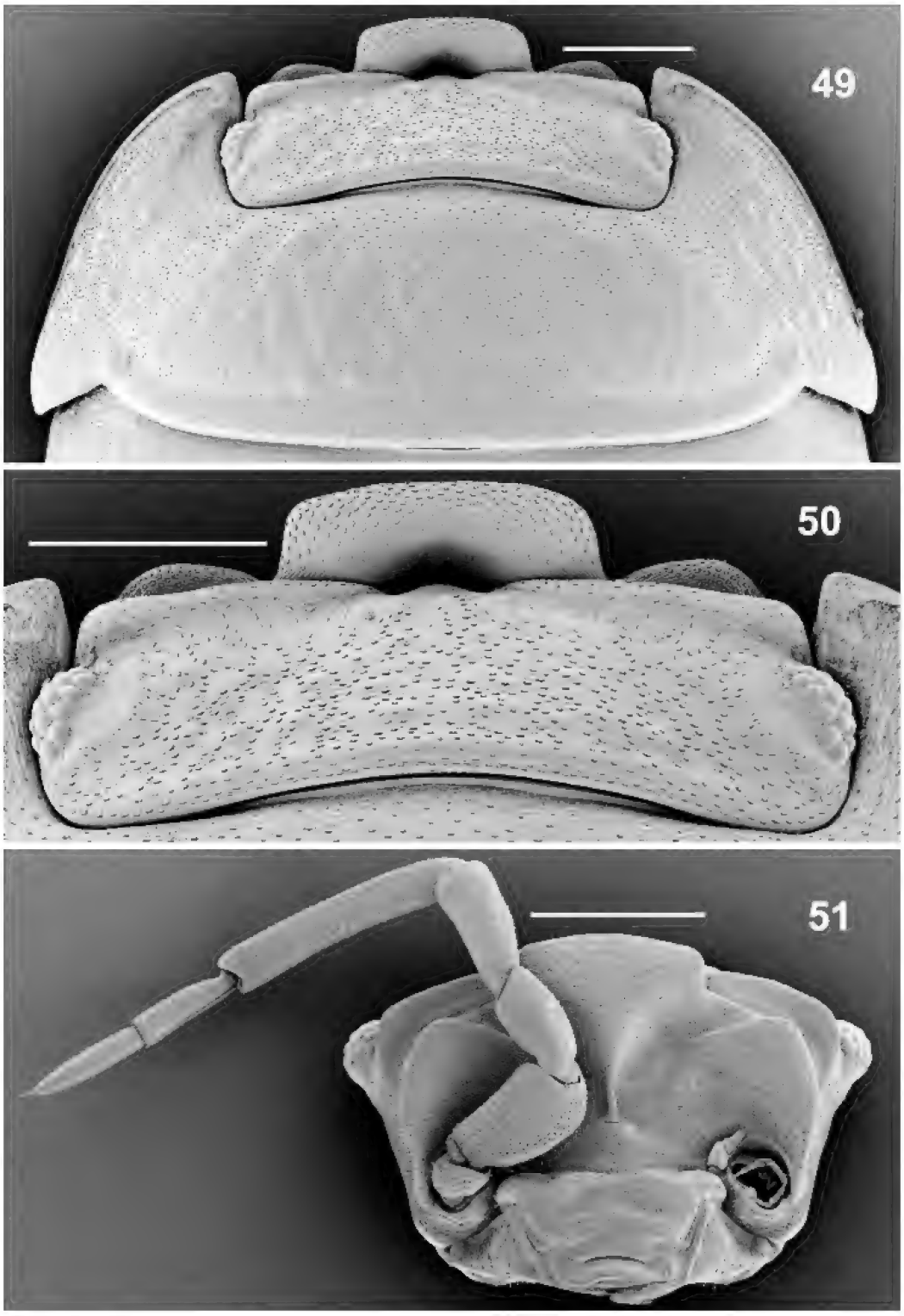
4.6 *Armadillidium cythereium* Strouhal, 1937
(Figs. 49–58 and map Fig. 48)

Literature records

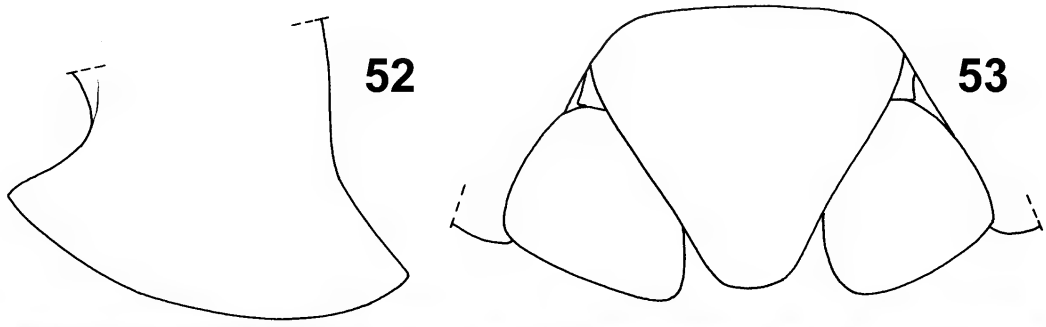
STROUHAL 1937b: 106, fig. 5 (island Kíthira); SFENTHOURAKIS 1993: 623 (islands Prasonísi and Antikíthira between Kíthira and Crete).

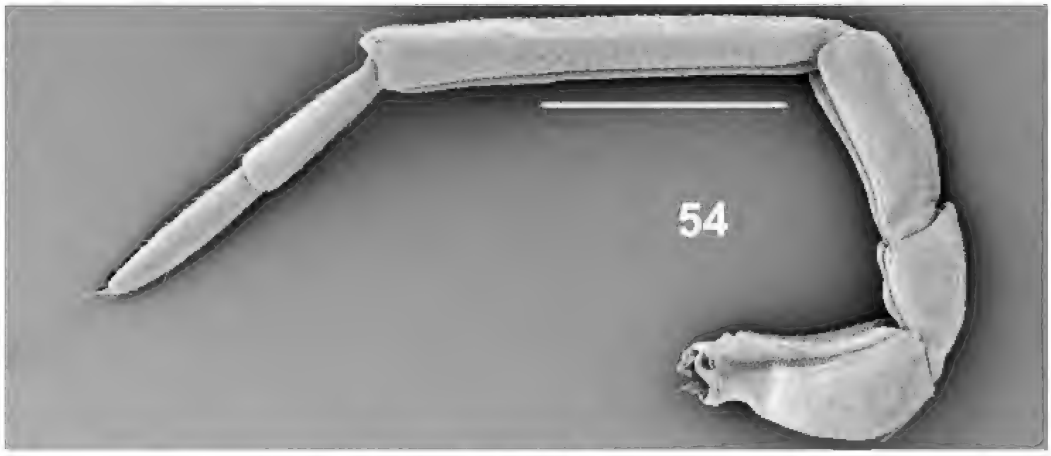
Material examined

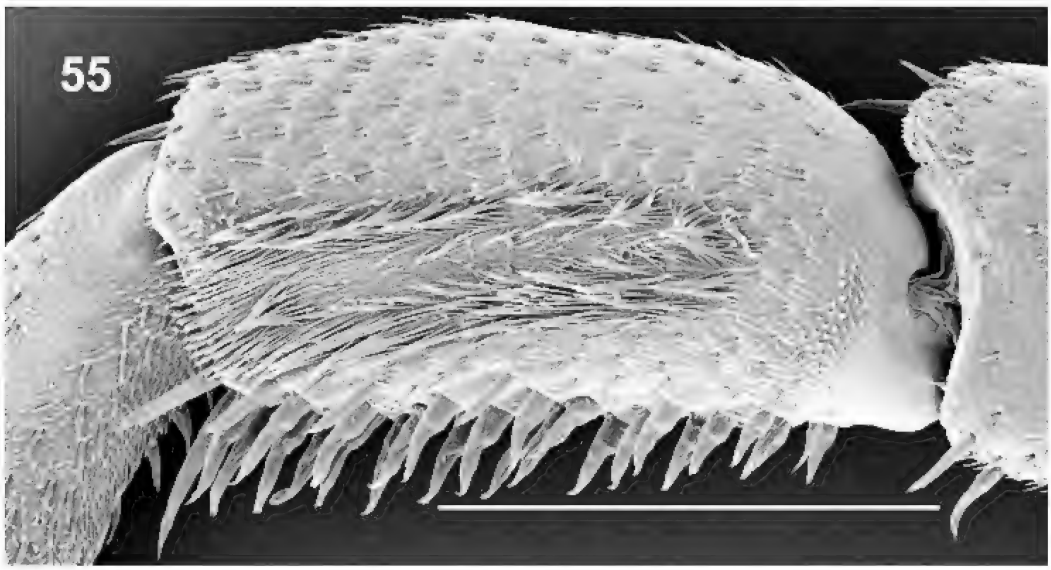
Greece: 3 ex., island Kíthira S of SE-Peloponnese, W of Avlémonas, leg. MALICKY, 8.V.1976



Figs. 49–51. *Armadillidium cythereium* (Greece, island Kíthira, SMNS 2865). – **49**. ♂, 13 mm long, head and pereion-tergite 1 in dorsal view. **50**. ♂, 13 mm long, head in dorsal view. **51**. ♀, 11.5 mm long, head in frontal view. – Scales: 1 mm.

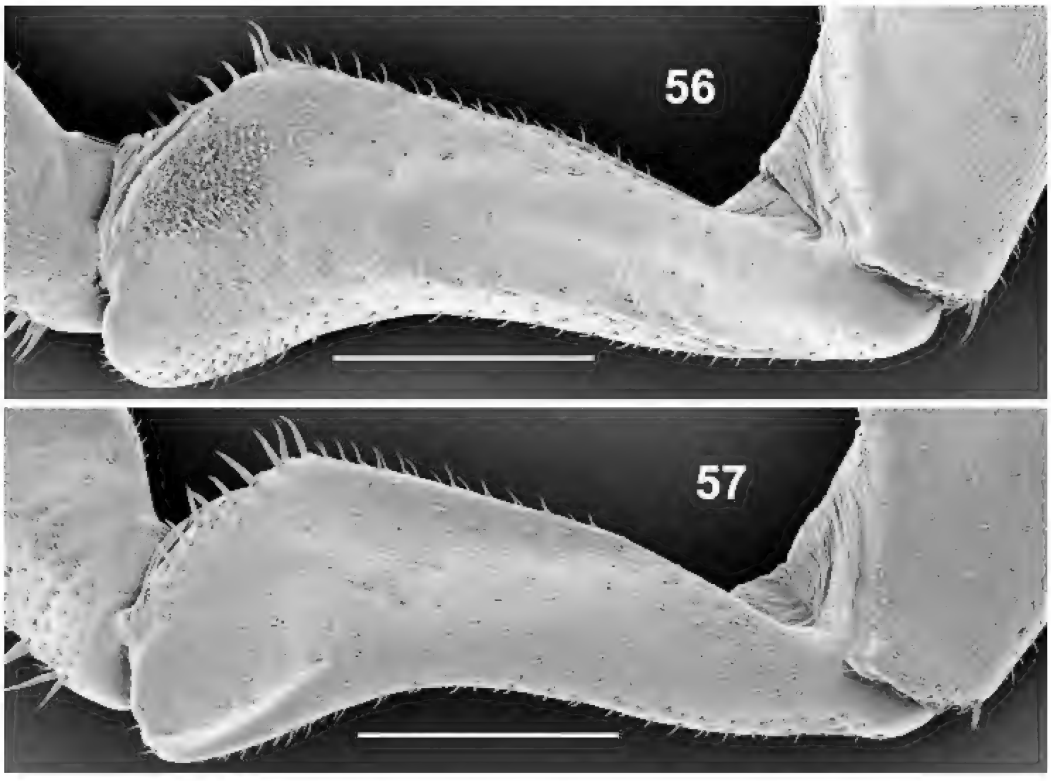


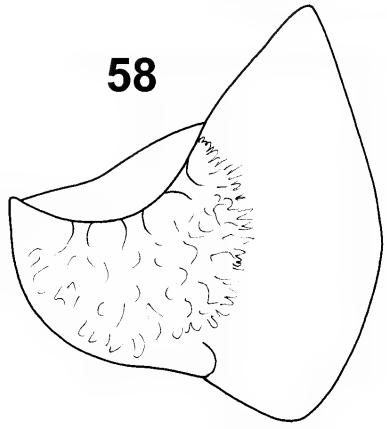




Figs. 52–55. *Armadillidium cythereium* (Greece, island Kíthira, SMNS 2865). – **52**. ♂, 13 mm long, pereion-epimeron 1, dorsolateral view. **53**. ♂, 13 mm long, telson and uropods in situ, dorsal view. **54**. ♂, 12 mm long, antenna. **55**. ♂, 12 mm long, carpus 1, frontal view. – Scales: 1 mm (54), 0.5 mm (55).

(SMNS 1757). – 4 ex., island Kíthira, Krotíri, leg. Sfenthourakis, 13.II.1989 (SMNS 2214). – 3 ex., island Kíthira, Paleópoli, leg. Sfenthourakis, 10.II.1989 (SMNS 2207). – 4 ex., island Kíthira, Vurnáthes, leg. Sfenthourakis, 10.II.1989 (SMNS 2205). – 10 ex., island Kíthira, Kálamos, leg. Sfenthourakis, 11.II.1999 (SMNS 2865).





Figs. 56–58. *Armadillidium cythereium*, ♂, 12 mm long (Greece, island Kíthira, SMNS 2865). – **56**. Ischium 7, frontal view. **57**. Ischium 7, caudal view. **58**. Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm.

Diagnostic characters

Maximum dimensions: 13 × 6 mm.

Coloration: Greyish brown with usual yellowish muscle spots and conspicuously lighter epimera.

Cuticular structures: Tergites tuberculated.

Frontal shield from behind surpassing frontal margin of head by nearly one third, upper margin straight, laterally with rounded angles (Figs. 49–50); antennal lobes trapezoidal (Fig. 51). Hind margin of pereion-epimeron 1 with pronounced angle

(Fig. 52). Telson slightly wider than long, with nearly straight sides and broadly rounded apex (Fig. 53). Antenna see Figs. 51 and 54, segments of the flagellum more or less the same length. Male carpus 1 with brush of short spines (Fig. 55); male ischium 7 ventrally concave, frontally with distal field of short spiny setae (Figs. 56–57). Male pleopod-exopodite 1 with pronounced pointed triangular hind-lobe (Fig. 58), endopodite 1 with apex straight.

Distribution

Island Kíthira S of southeastern Peloponnese and further islands between Kíthira and western Crete (where it is certainly missing) (see map Fig. 48).

Remarks

A. cythereium is the sister-species of *A. laconicum* from the south-eastern Peloponnese. In former publications I considered the two species as probably conspecific. A closer investigation revealed however clear differences between these two forms. In *A. cythereium* the frontal shield is higher, the antennal lobes are trapezoidal and not semicircular, the antennae are shorter and stouter, and the male pleopod-exopodite 1 shows a slightly different shape. So for the moment I treat the two forms as two different species.

4.7 *Armadillidium granulatum* Brandt, 1833

This species was treated in the 23rd contribution of this series (*Armadillidium* on the Peloponnese, Schmalfuss 2006). It is known from the coasts of the Mediterranean Sea east to Asia Minor and Libya and the southwestern coast of the Black Sea; isolated records exist from the Atlantic coast of Portugal and northern France (Normandie).

4.8 *Armadillidium insulanum* Verhoeff, 1907
(Figs. 59–70 and map Fig. 71)

Synonyms: *A. emmae* Strouhal, 1937, *A. lemnium* Strouhal, 1937, *A. mohamedanicum* Verhoeff, 1929, *A. samothracium* Strouhal, 1937, *A. scyrium* Strouhal, 1929.

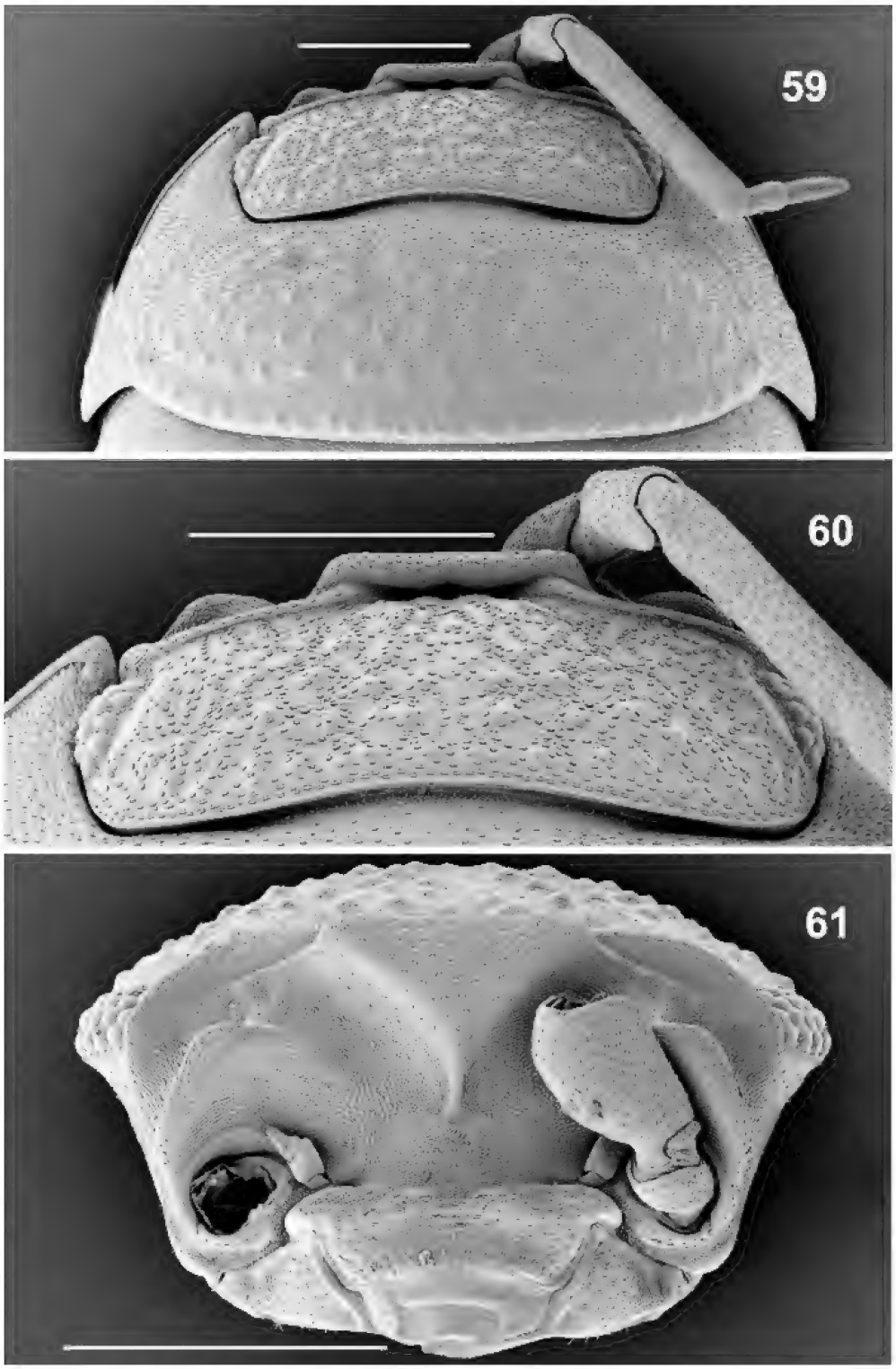
A. insulanum kigatense Verhoeff, 1943 from Istanbul is *A. granulatum* (types investigated).

Literature records

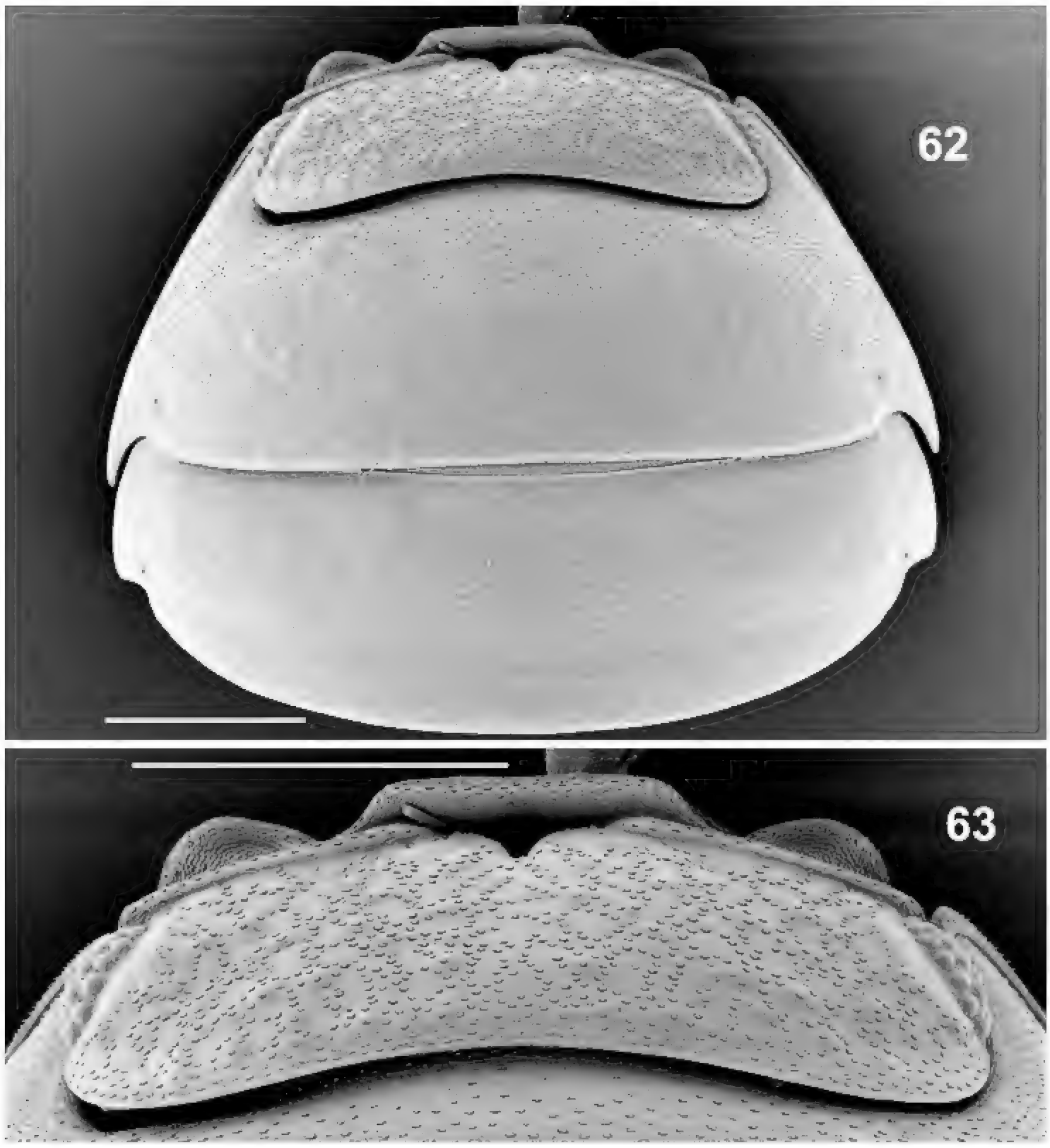
Verhoeff 1907: 471, 492 (GR, Aegean island Náxos); Verhoeff 1929: 130 (*A. mohamedanicum*, TR, Gelibolu at European coast of the Dardanelles); Strouhal 1929a: 93 (GR, Aegean islands Náxos and Dílos); Strouhal 1929b: 73, figs. 49–53 (*A. scyrium*, GR, Aegean island Skíros); Strouhal 1937c: 234, figs. 25–35 (*A. insulanum*, *A. emmae*, *A. lemnium*, *A. samothracium*, GR, Aegean islands Ándros, Kéa, Páros, Antíparos, Samothráki, Límnos, Khíos, Sámos, Ikaría); Strouhal 1939: 256 (*A. lemnium thasium*, GR, northern Aegean island Thásos); Schmalfuss 1981a: 18 (*A. scyrium*, GR, 6 islands of the Northern Sporades); Schmalfuss 1981b: 285, figs. 55–61 (GR, Aegean island Míkonos); Schmalfuss 1985: 291, figs. 1–9 (GR, Northern Sporades, Évvia, Cyclades); Sfenthourakis 1994: 130 (GR, central Aegean islands).

Material examined

Greece: Eastern Macedonia: 1 ex., district Dráma, 50 km N of Paranésti, 1400 m, leg. Schmalfuss, 26.IX.1988 (SMNS 2239). – 13 ex., district Dráma, 25 km N of Paranésti, 300 m, deciduous forest and pasture, leg. Schmalfuss, 9.V.1990 and leg. Schawaller, 27.IV.1994 (SMNS 2266, 2442). – 24 ex., district Dráma, 5 km N of Paranésti, river Néstos, leg. Schmalfuss, 21.IX.1988 (SMNS 2243). – 25 ex., district Kavála, 10 km N of Paleá Kavála, 600 m, *Cas-*

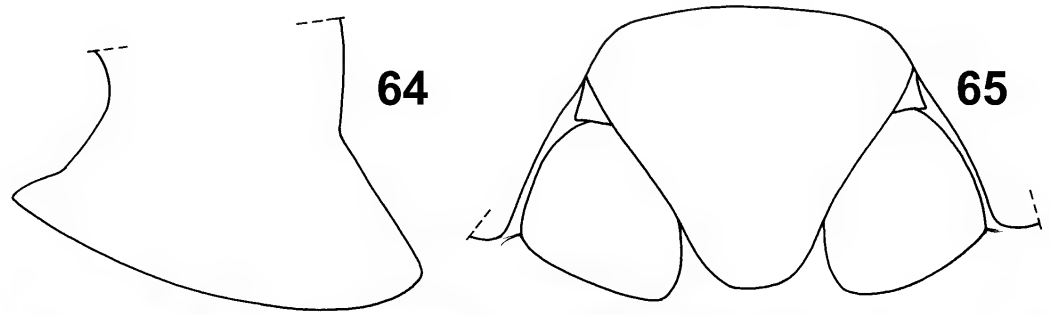


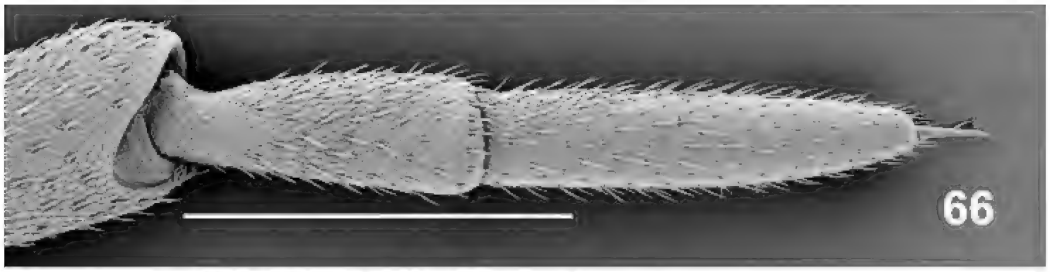
Figs. 59–61. *Armadillidium insulanum* (Greece, Cyclades, island Kufonísi, SMNS 2085). – **59**. ♂, 10 mm long, head and pereion-tergite 1 in dorsal view. **60**. ♂, 10 mm long, head in dorsal view. **61**. ♀, 9.5 mm long, head in frontal view. – Scales: 1 mm.

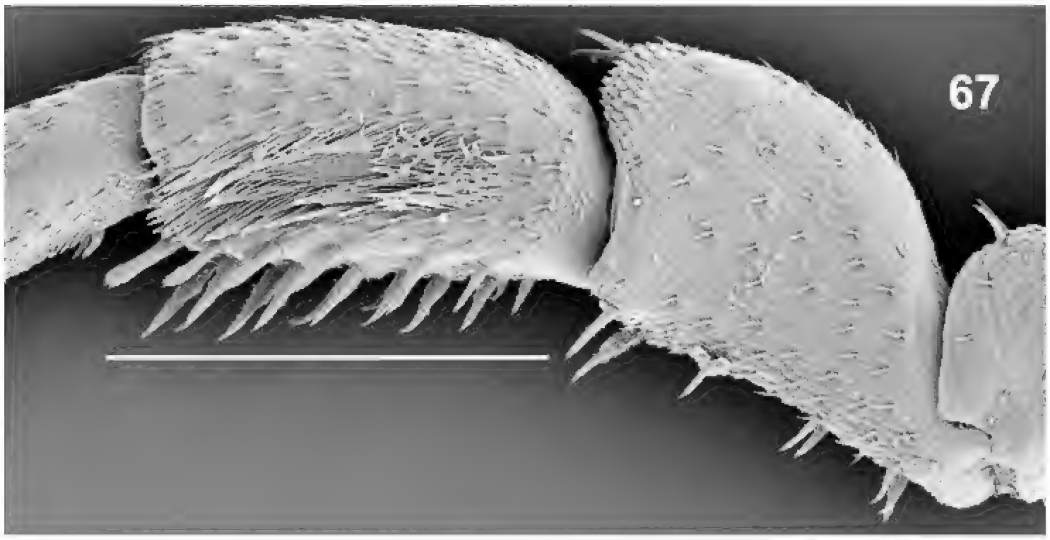


Figs. 62–63. *Armadillidium insulanum*, ♀, 10.5 mm long (Turkey, northeastern Aegean island Gökçe Ada, SMNS 11273). – **62**. Head and pereion-tergites 1 and 2 in dorsal view. **63**. Head in dorsal view. – Scales: 1 mm.

tanea, maquis, leg. SCHAWALLER & SCHMALFUSS, 20.IV.1994 (SMNS 2430). – 53 ex., district Kavála, 2 km SW of Lekáni, 900 m, *Fagus*, *Carpinus*, leg. SCHMALFUSS, 6.V.1990 and 19.X.2005 (SMNS 2270, 2882). – 12 ex., district Kavála, S of Lekáni Mountains, 2 km N Polínero, mixed forest, leg. SCHMALFUSS, 6.V.1990 (SMNS 2271). –2 ex. (*?insulanum*), district Kavála, Nikités S of Lekáni Mountains, leg. SCHMALFUSS, 19.X.2005 (SMNS 2883). — Thrace (northeastern mainland): 32 ex., district Xánthi, Toxótes, Néstos gorge, leg. SCHMALFUSS, 30.IV.1990, and leg. SCHAWALLER & SCHMALFUSS, 25.IV.1994 (SMNS 2283, 2435). – 5 ex., district Xánthi, above Toxótes, 900 m, leg. SCHMALFUSS, 18.X.2005 (SMNS 2884). – 6 ex., district Rodópi, Pagúria 12 km SW of Komotiní, leg. STEINBRÜCK, 28.V.1988 (SMNS 2181). – 1 ex., district Rodópi, 5 km SW of Marónia, pebble beach, leg. SCHMALFUSS, 24.IV.1994 (SMNS 2423). – 3 ex., district Rodópi, 15 km E of Komotiní, *Quercus* forest, leg. SCHMALFUSS, 28.IV.1990 (SMNS 2287). – 1 ex., district Rodópi, 5 km E of Néa Sánta, leg. SCHAWALLER, 23.IV.1994

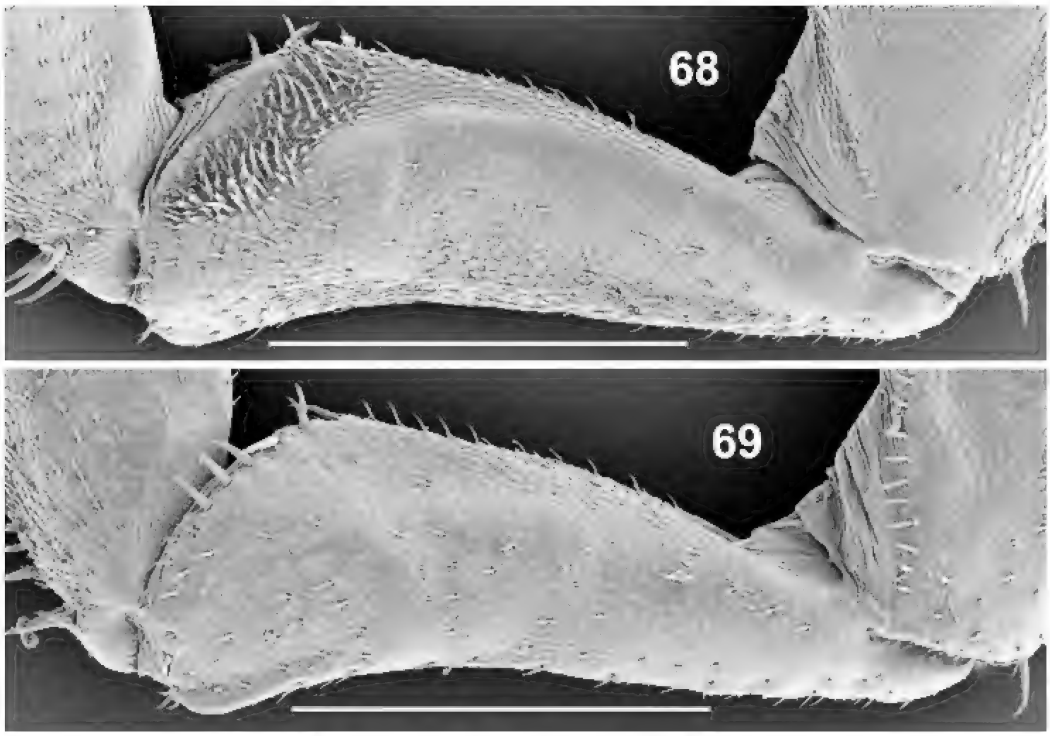


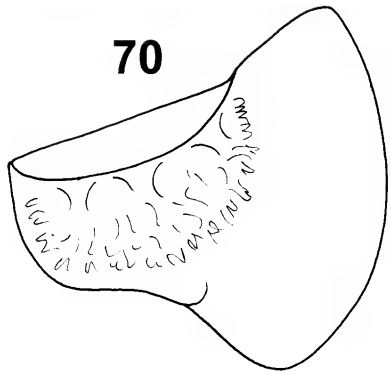




Figs. 64–67. *Armadillidium insulanum* (Greece, Cyclades, island Kufonísi, SMNS 2085). – **64**. ♂, 11 mm long, pereion-epimeron 1, dorsolateral view. **65**. ♂, 11 mm long, telson and uropods in situ, dorsal view. **66**. ♂, 10 mm long, antennal flagellum. **67**. ♂, 10 mm long, merus and carpus 1, frontal view. – Scales: 0.5 mm.

(SMNS 2439). – 9 ex., district Évros, 5 km N of Orestiáda, leg. SCHMALFUSS, 25.IV.1990 (SMNS 2292). – 9 ex., district Évros, 10 km NW of Didimótikho, *Quercus*, leg. SCHAWALLER, 22.IV.1994 (SMNS 2438). – 3 ex., district Évros, 5 km S of Míkro Dério, leg. SCHMALFUSS, 23.IV.1994 and 23.X.2005 (SMNS 2419, 2876). – 1 ex., district Évros, Méga Dério, 400 m, *Quercus*, leg. SCHAWALLER, 23.IV.1994 (SMNS 2440). – 7 ex., district Évros, Sápka-Pass, 900 m, *Fagus*, *Quercus*, leg. SCHMALFUSS, 25.IV.1990 (SMNS 2289). – 3 ex., district Évros, 20 km SW of Dadiá, 100 m, *Quercus*, leg. SCHAWALLER, 21.IV.1994 and leg. SCHMALFUSS, 26.V.1999 (SMNS 1737, 2431). – 17 ex., district Évros, 10 km N of Alexandrúpoli, leg. SCHMALFUSS, 29.IV.1986 (SMNS 2128). – 2 ex., district Évros, Ardánio, leg. SCHMALFUSS, 7.V.1986 (SMNS 2129). – 2 ex., district Évros, Évros delta, leg. SCHMALFUSS, 21.X.2005 (SMNS 2879). — Northern Aegean islands: 29 ex., Thásos, leg. SCHMALFUSS, V.1997





Figs. 68–70. *Armadillidium insulanum* (Greece, Cyclades, island Kufonísi, SMNS 2085). – **68**. ♂, 10 mm long, ischium 7, frontal view. **69**. ♂, 10 mm long, ischium 7, caudal view. **70**. ♂, 11 mm long, pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm.

(SMNS 2590, 2591, 2595). – 2 ex., Samothráki, leg. Liebegott, 13.–16.IX.1984 (SMNS 2091). – 25 ex., Límnos, 4 localities, leg. Erhard & Schmalfuss, V.1995 (SMNS 2513, 2520–22). – 4 ex., Ágios Efstrátios, leg. Mylonas, II.1989 (SMNS 2208). – 110 ex., Lésvos, 16 localities, leg. Erhard & Schmalfuss, V.1995 (SMNS 2487–89, 2491, 2493–96, 2499, 2500, 2503, 2507, 2508) and leg. D. Grimm, V.1995 and V.1996 (SMNS 2523, 2583, 2587). — Northern Sporades: 8 ex., island Skiropúla SW of Skíros, leg. Liebegott, 20.V.1985 (SMNS 2123). — Évvia and Attica: 3 ex. (*?insulanum*), Attica, Agía Marína 15 km NE of Marathónas, leg. Sfenthourakis, 15.XI.1992 (SMNS 2711). – 10 ex., Évvia, Prokopí 45 km NW of Khalkída, *Platanus*, leg. Schmalfuss, 20.IV.1978 (SMNS 1845). — Central Aegean islands: 2 ex., Sífnos, leg. Maurer, 24.IV.1989 (SMNS 2216). – 8 ex., Sérifos, leg. Schmalfuss, 27.IV.1993 (SMNS 2340). – 1 ex., Mílos, Profítis Ilías, leg. Schmalfuss, 24.IV.1993 (SMNS 2343). – 1 ex., Síros, Kíni, leg. Schmalfuss, 23.V.1976 (SMNS 1694). – 1 ex., Náxos, leg. Deeleman,

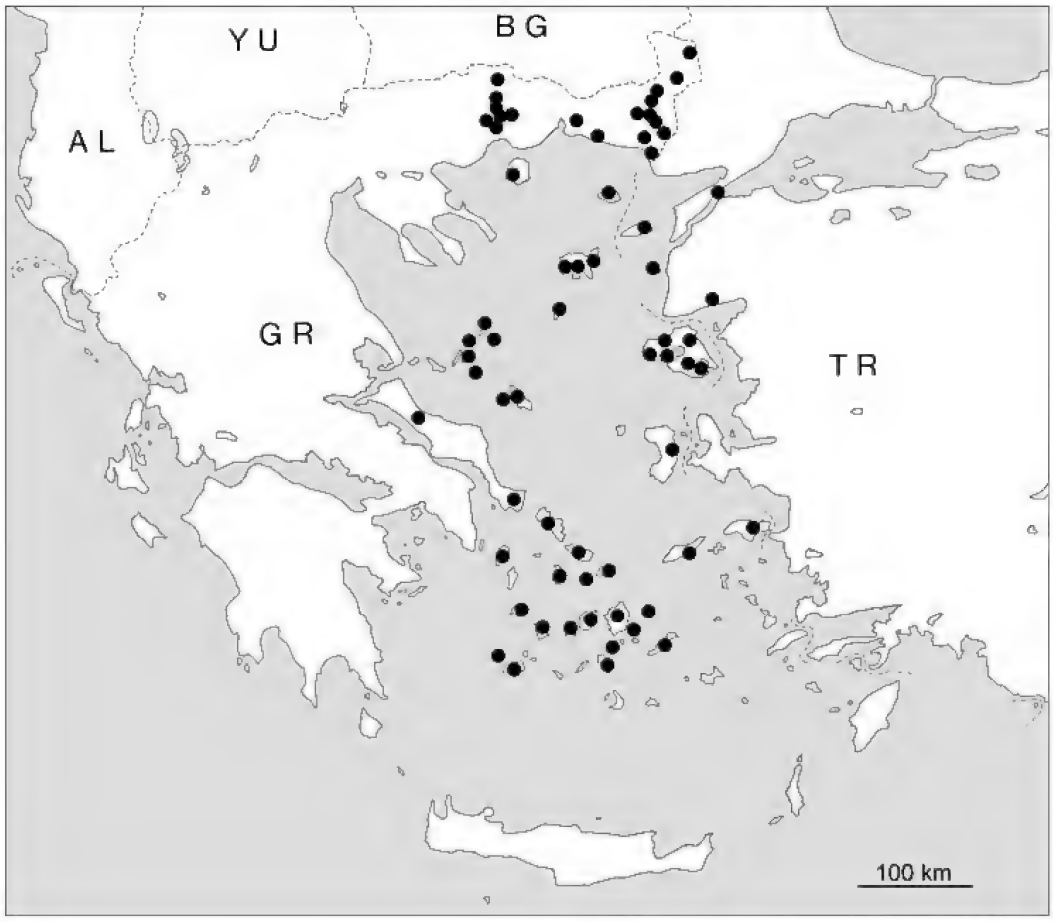


Fig. 71. Records of *Armadillidium insulanum* sensu lato (compare Remarks).

23.IV.1984 (SMNS 2257). – 4 ex., Áno Kufonísi SE of Náxos, leg. Liebegott, 27.IV.1984 (SMNS 2085, published in Schmalfuss 1985). – 3 ex., Íos, leg. Schmalfuss, 9.V.1991 (SMNS 2300).

NW-Turkey: 2 ex. (type specimens of *A. mohamedanicum*), European coast of the Dardanelles, Gelibolu (= Gallipoli), leg. Buresch, 3.V.1913 (ZSM, Verhoeff 1929). – 8 ex., northern Aegean island Gökçe Ada, Merkoz-Kaleköy, leg. Liegegott, 13.V.1987 (SMNS 11273). – 3 ex., northern Aegean island Bozca Ada, leg. Liebegott, 23.V.1988 (SMNS 11272). – 5 ex., Aegean coast, Altinoluk 30 km W of Edremit (opposite Greek island Lésvos), leg. Liebegott, 10.VI.1989 (SMNS 11135). – 2 ex. (*?insulanum*), 80 km E of Bursa, Osmaneli, leg. Osella, 13.VII.1972 (SMNS 11476).

Diagnostic characters

Dimensions: Maximum size 12 × 6 mm; smallest ♀ with marsupium 7 mm long (from island Adelfí, Northern Sporades).

Coloration: Light brown with usual yellowish muscle spots, epimera lighter, in many specimens conspicuously yellow without dark pigmentation.

Cuticular structures: Tergites granulated; in the specimens from the northern Aegean islands and the northeastern mainland the granulation is hardly recognizable.

Frontal shield from behind slightly surpassing frontal margin of head, upper margin straight, laterally with angle or more rounded, caudally with more or less con-

spicuous groove (Figs. 60, 61, 63); antennal lobes trapezoidal (Fig. 61). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 64). Telson wider than long, with nearly straight sides and broadly rounded apex (Fig. 65). Antenna with proximal segment of flagellum shorter than distal one (Fig. 66). Male carpus 1 with brush of short spines (Fig. 67); male ischium 7 ventrally concave, frontally with distal hair-field (Figs. 68–69). Male pleopod-exopodite 1 with short triangular hind-lobe (Fig. 70), a certain variability in the shape can be recognized if Fig. 70 is compared with figs. 2 and 9 in SCHMALFUSS (1985); endopodite 1 with apex straight.

Distribution

The species in its present definition is recorded from the northeastern mainland from Kavála eastward, from the Turkish coast of the Aegean, and from nearly all Aegean islands south to Mílos and Íos (see map Fig. 71).

Remarks

A. insulanum is a very variable species, the dorsal tuberculation, the frontal shield, the shape of pereion-epimera 1 and the telson show a clinal variation in a considerable degree (compare Figs. 59–60 with Figs. 62–63). There are, however, no abrupt differences between neighboring populations, exhibiting a gradual change of these characters, so presently there is no reliable basis for dividing this taxon into different species or subspecies, as it has been done in the past on the basis of single specimens. As in the case of *A. ameglioi* more detailed studies may plead for a separation of the *insulanum*-complex into a number of separate species, for the time being it seems, however, a tenable and reasonable solution to treat these populations under the common name *A. insulanum* sensu lato. One exception I make is *A. pelionense* Strouhal, 1928 (compare STROUHAL 1928: 103, figs. 10–14) from the Pílio Mountains on the mainland adjacent to the Northern Sporades. This taxon is certainly a representative of the *insulanum*-group in the Pílio region, the differences towards the populations of the Northern Sporades are, however, consistent and conspicuous, so for the time being I treat *A. pelionense* as a distinct species (one sample investigated: 3 ex., eastern central Greece, Pílio Mountains, pass above Portariá, leg. PIEPER & RUNZE, 28.IX.1978, SMNS 1891).

For separation from *A. aegaeum* see Remarks under that species.

4.9 *Armadillidium lymberakisi* Schmalfuss, Paragamian & Sfenthourakis, 2004

(Figs. 72–82 and map Fig. 83)

Literature records

SCHMALFUSS et al. 2004: 37, figs. 56–65 (Crete: Lefká Óri).

Material examined

Greece: 10 ex., Crete, Lefká Óri, 2000 m, pitfall traps, leg. LYMBERAKIS, 1992 (SMNS 1173).

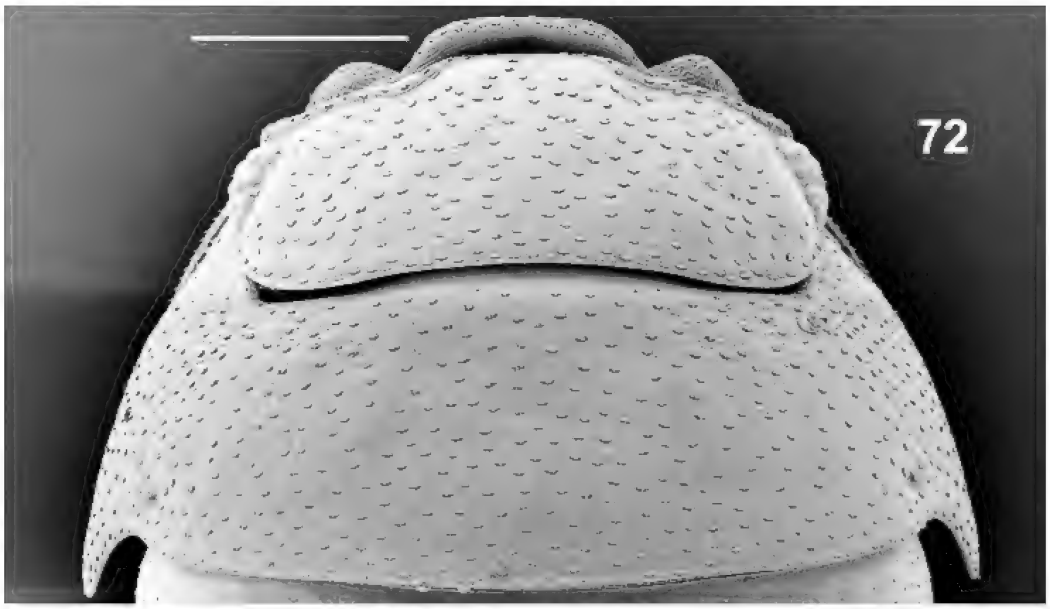
Diagnostic characters

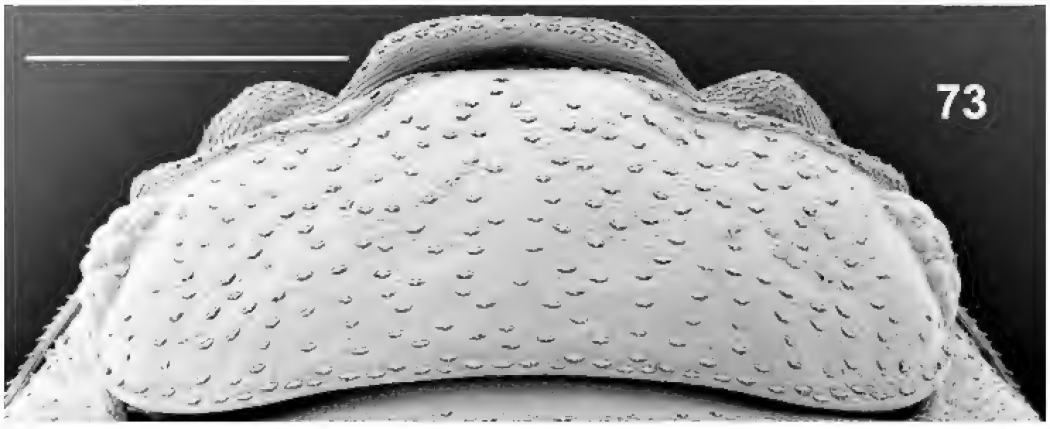
Maximum dimensions: 8.5 × 3.5 mm.

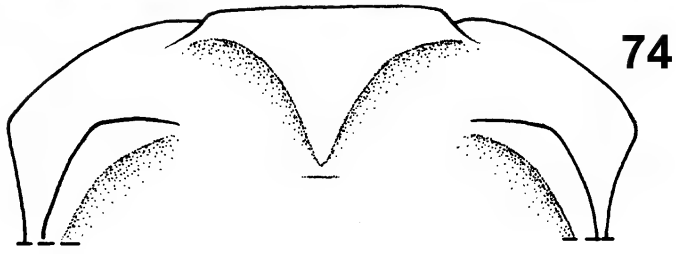
Coloration: Greyish brown with usual muscle-spots, epimera lighter.

Cuticular structures: Tergites completely smooth as in *A. vulgare*.

Frontal shield from behind surpassing frontal margin of head, with straight upper

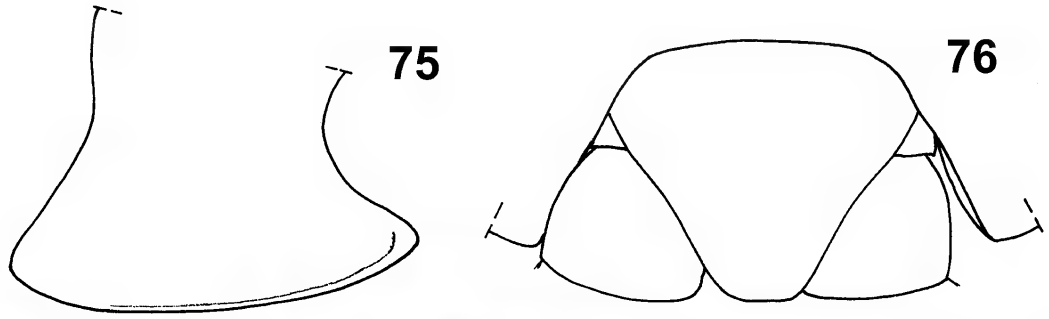


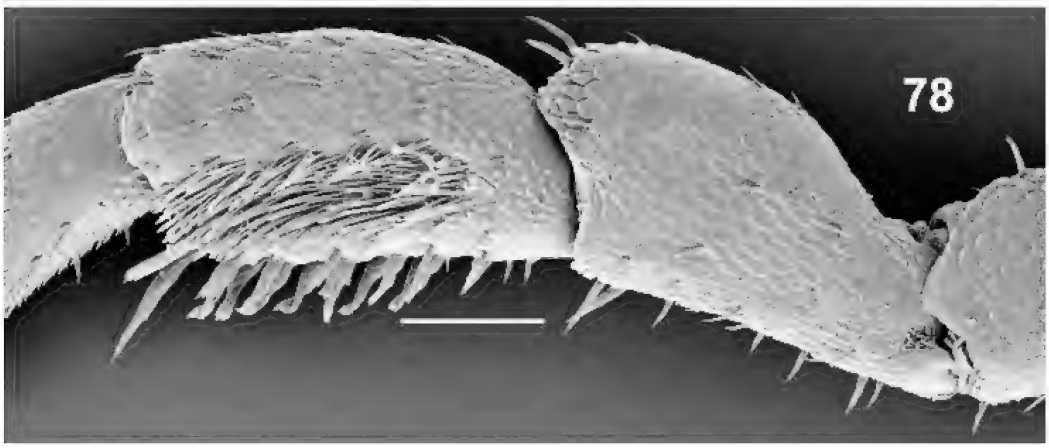




Figs. 72–74. *Armadillidium lymberakisi*, ♂, 6 mm long (Crete, Lefká Óri, SMNS 1173). – **72**. Head and pereion-tergite 1 in dorsal view. **73**. Head in dorsal view. **74**. Head in frontal view (from SCHMALFUSS et al. 2004). – Scales: 0.5 mm.

margin (Figs. 72–73); antennal lobes trapezoidal (Fig. 74). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 75). Telson wider than long, with nearly straight sides and broadly rounded apex (Fig. 76). Antenna see Fig. 77, distal segment of flagellum twice as long as proximal one. Male carpus 1 with brush of short spines (Fig. 78); male ischium 7 ventrally slightly concave, frontally without distal hair-field



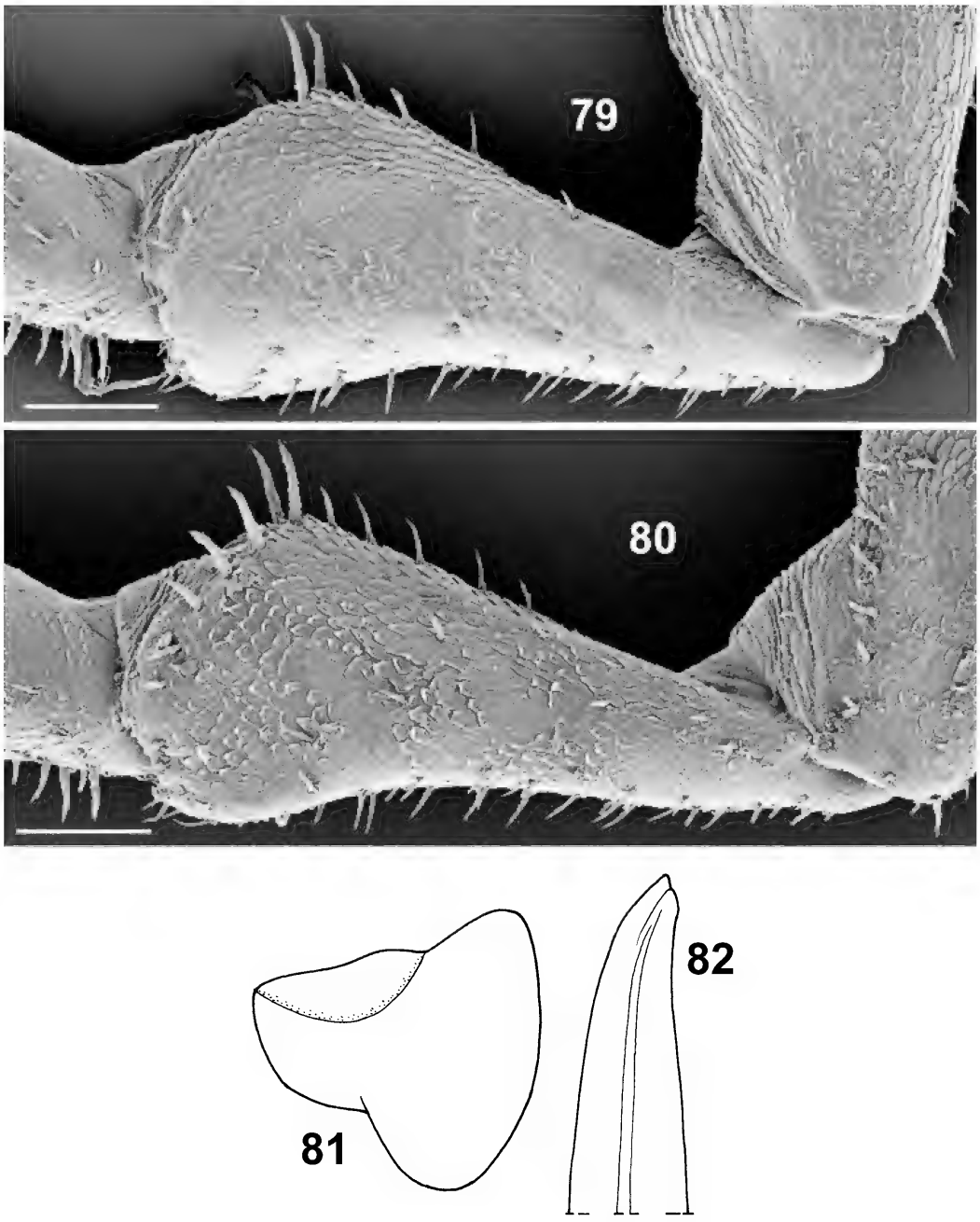


Figs. 75–78. *Armadillidium lymberakisi*, ♂, 6 mm long (Crete, Lefká Óri, SMNS 2085). – **75**. Pereion-epimeron 1, dorsolateral view (from SCHMALFUSS et al. 2004). **76**. Telson and uropods in situ, dorsal view (from SCHMALFUSS et al. 2004). **77**. Antenna. **78**. Merus and carpus 1, frontal view. – Scales: 0.5 mm (77), 0.1 mm (78).

(Figs. 79–80). Male pleopod-exopodite 1 with short rounded hind-lobe (Fig. 81), endopodite 1 with apex straight (Fig. 82).

Distribution

The species is known only from the alpine zone around 2000 m in the Lefká Óri on Crete (see map Fig. 83).



Figs. 79–82. *Armadillidium lymberakisi*, ♂, 6 mm long (Crete, Lefká Óri, SMNS 2085). – **79**. Ischium 7, frontal view. **80**. Ischium 7, caudal view. **81**. Pleopod-exopodite 1, dorsal view (from SCHMALFUSS et al. 2004). **82**. Apex of pleopod-endopodite 1 (from SCHMALFUSS et al. 2004). – Scales: 0.1 mm.

4.10 *Armadillidium marmoratum* Strouhal, 1929

This species was treated in the 23rd contribution of this series (*Armadillidium* on the Peloponnese, SCHMALFUSS 2006). It is known from the coasts of Greece (Ionian island Lefkáda, Peloponnese, Aegean islands, northern Aegean coast), western

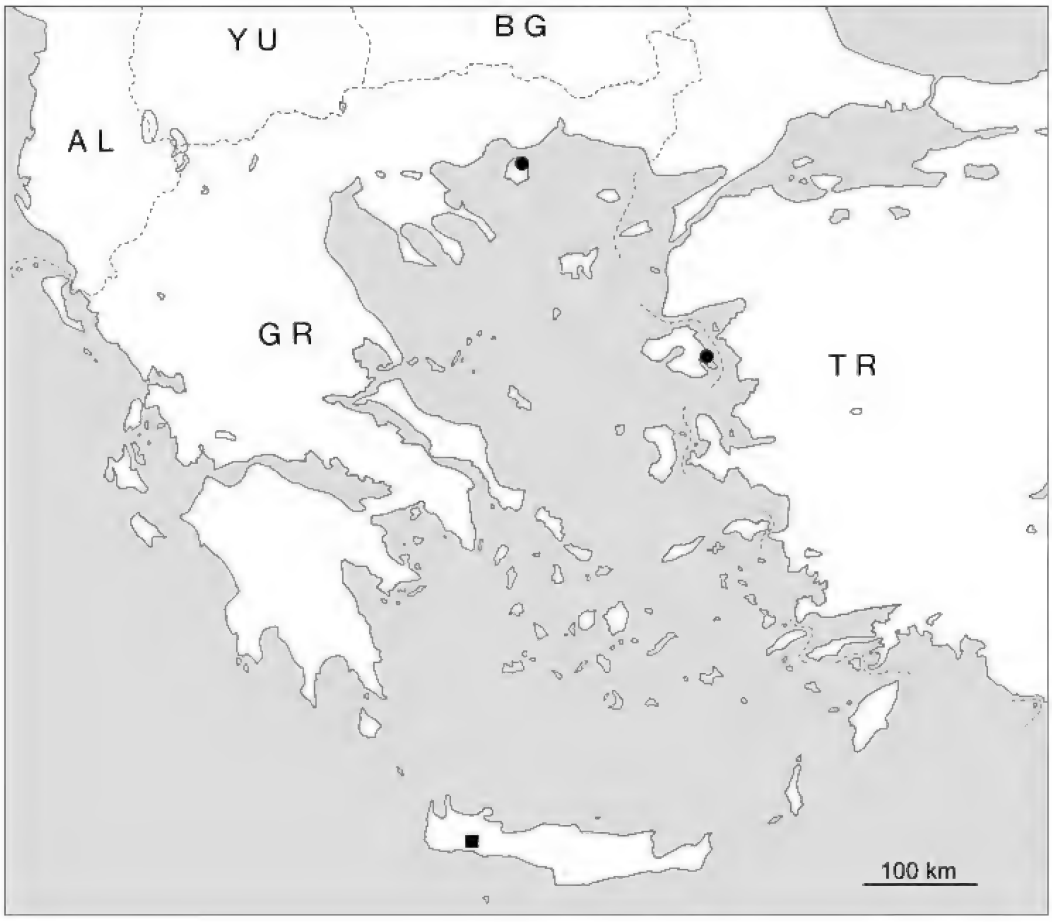


Fig. 83. Records of *Armadillidium lymberakisi* (■) and *A. peraccae* (●, only Greek records).

Turkey including Black Sea coast, Cyprus, Israel and Egypt. A map of the overall distribution is found in SCHMALFUSS (2000: 79, fig. 4), for safe Greek records see map fig. 153 in SCHMALFUSS (2006).

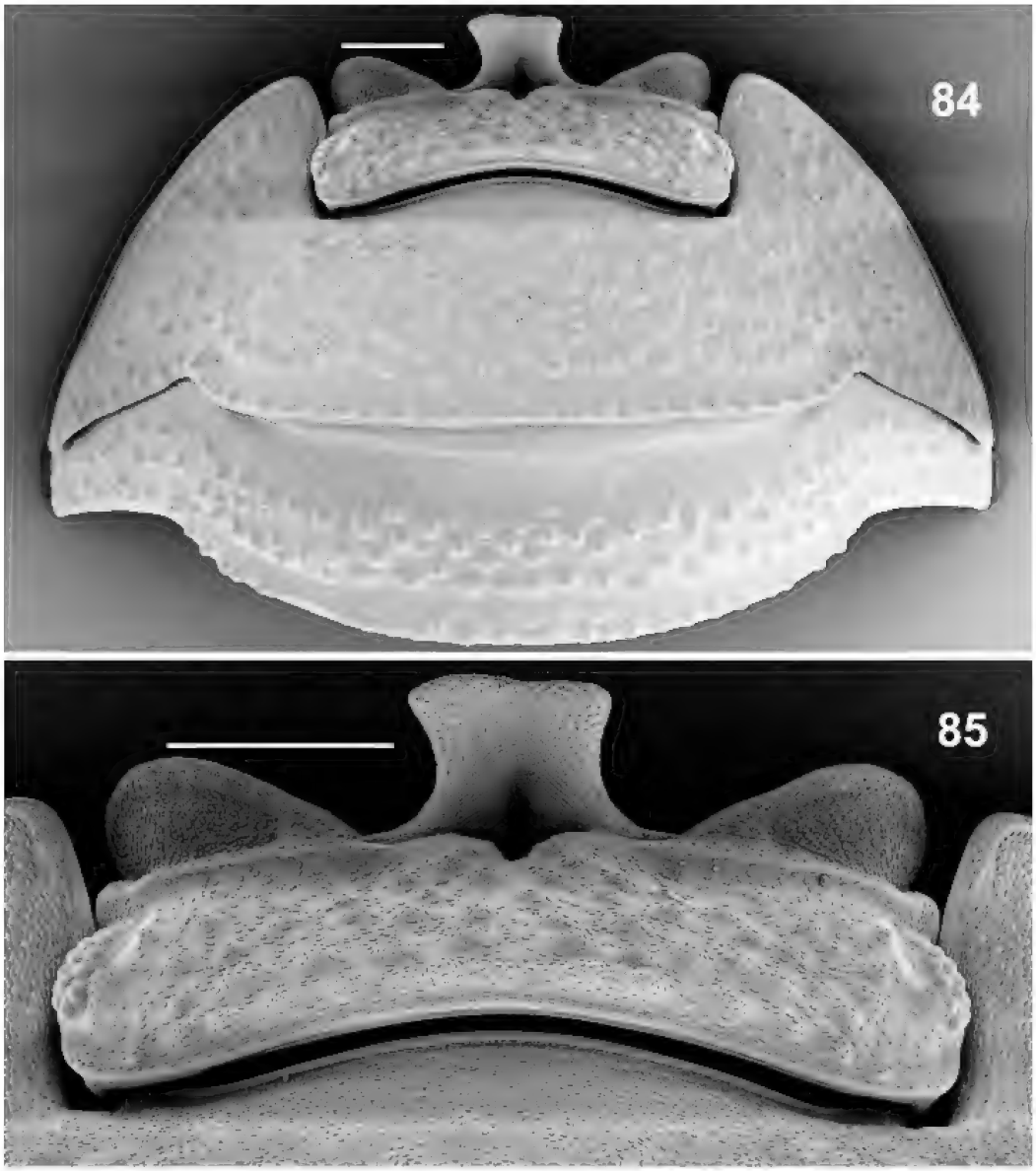
4.11 *Armadillidium peloponnesiacum* Verhoeff, 1901

Also this species is treated in SCHMALFUSS (2006). It is a Greek endemic recorded from western, central and southern Greece including Ionian islands Lefkáda, Kefaloniá and Zákinthos, and the Aegean islands Évvia and Skíros (map fig. 172 in SCHMALFUSS 2006).

4.12 *Armadillidium peraccae* Tua, 1900
(Figs. 5–6, 84–96 and map Fig. 83)

Literature records

The complete literature treating this species is listed in my World Catalog (SCHMALFUSS 2003: 39). These publications concern only records from southeastern Italy. In the meantime I consider the record of "*Armadillidium peraccai kosswigi* Verhoeff, 1936" from the coast of the Sea of Marmara and the material from the Greek Aegean islands Thásos and Lésvos to be



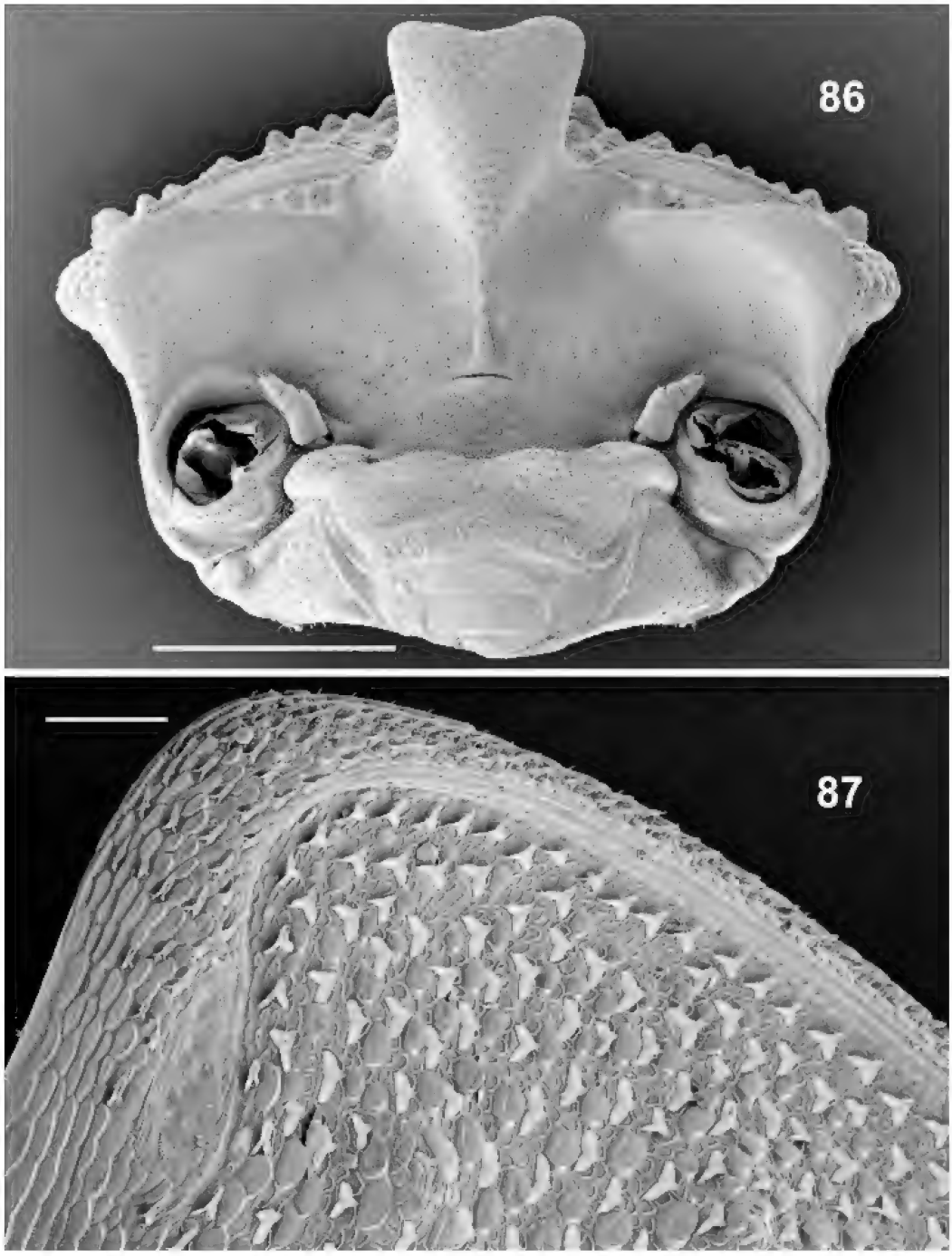
Figs. 84–85. *Armadillidium peraccae*, ♂, 18 mm long (Greece, northern Aegean island Thásos, SMNS 2592). – **84**. Head and pereion-tergites 1 and 2 in dorsal view. **85**. Head in dorsal view. – Scales: 1 mm.

conspecific with *A. peraccae* – in the Catalog (SCHMALFUSS 2003: 38) this taxon was supposed to belong to *A. pallasii* Brandt, 1833.

Material examined

Italy: 5 ex., NW of Brindisi, E of Locorotondo, 200 m, leg. SCHAWALLER, 18.IV.1994 (SMNS 7436). – 8 ex., surroundings of Bari, leg. KWET, 15.V.2004 (SMNS 7508).

Greece: 87 ex., Aegean island Thásos, leg. LIEBEGOTT, 13.V.1986, leg. SCHMALFUSS, V.1997 and V.1999, leg. KWET, V.2004 (SMNS 2133, 2591, 2592, 2646, 2647, 2809). – 8 ex., Aegean island Lésvos, Mitilíni, leg. PIEPER & RUNZE, 18.IX.1978 (SMNS 1885).

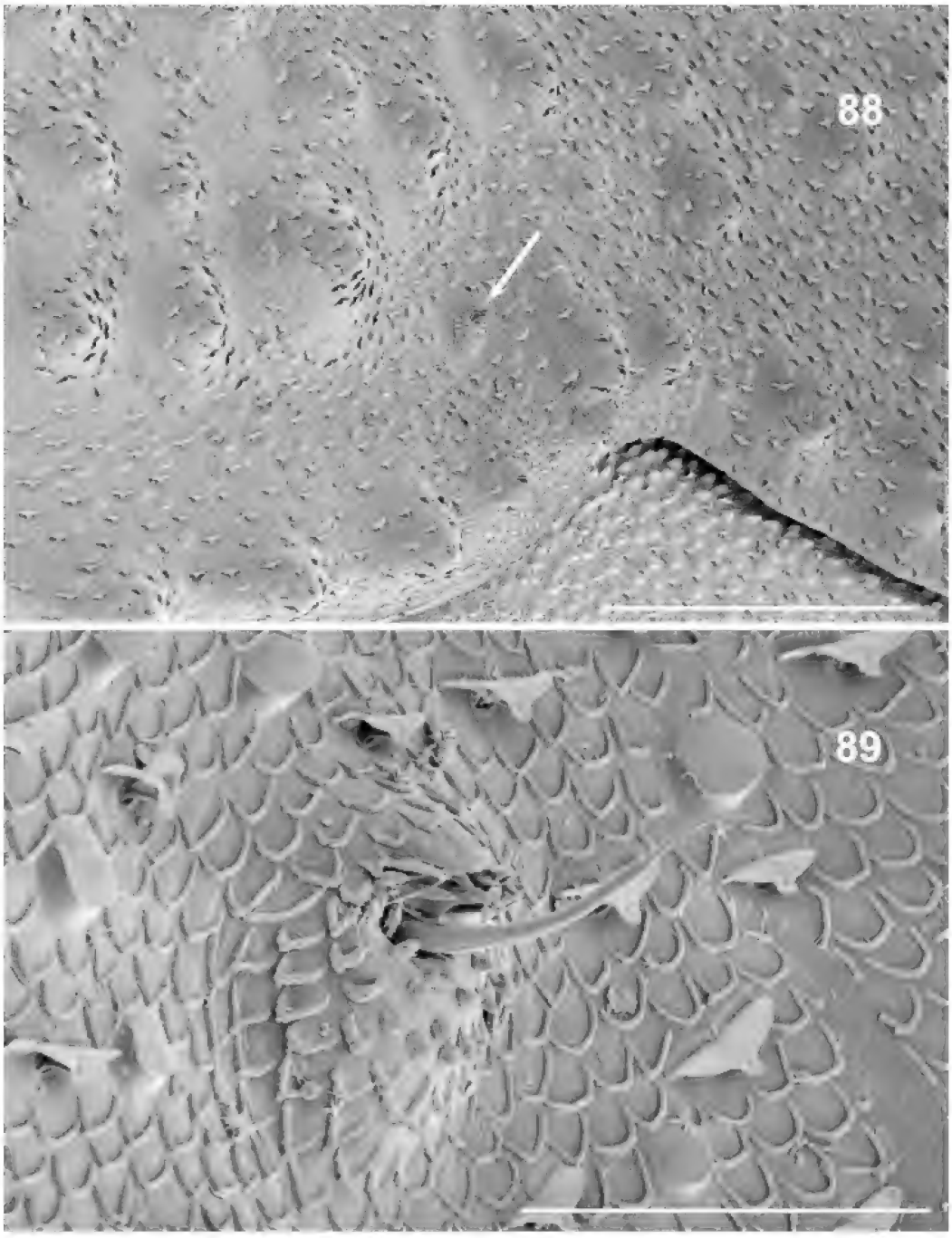


Figs. 86–87. *Armadillidium peraccae* (Greece, northern Aegean island Thásos). – **86.** ♂, 15.5 mm long (SMNS 2591), head in frontal view. **87.** ♂, 18 mm long (SMNS 2592), pereion-epimeron 1, frontal corner. – Scales: 1 mm (86), 0.1 mm (87).

Diagnostic characters

Maximum dimensions: 19 × 10 mm.

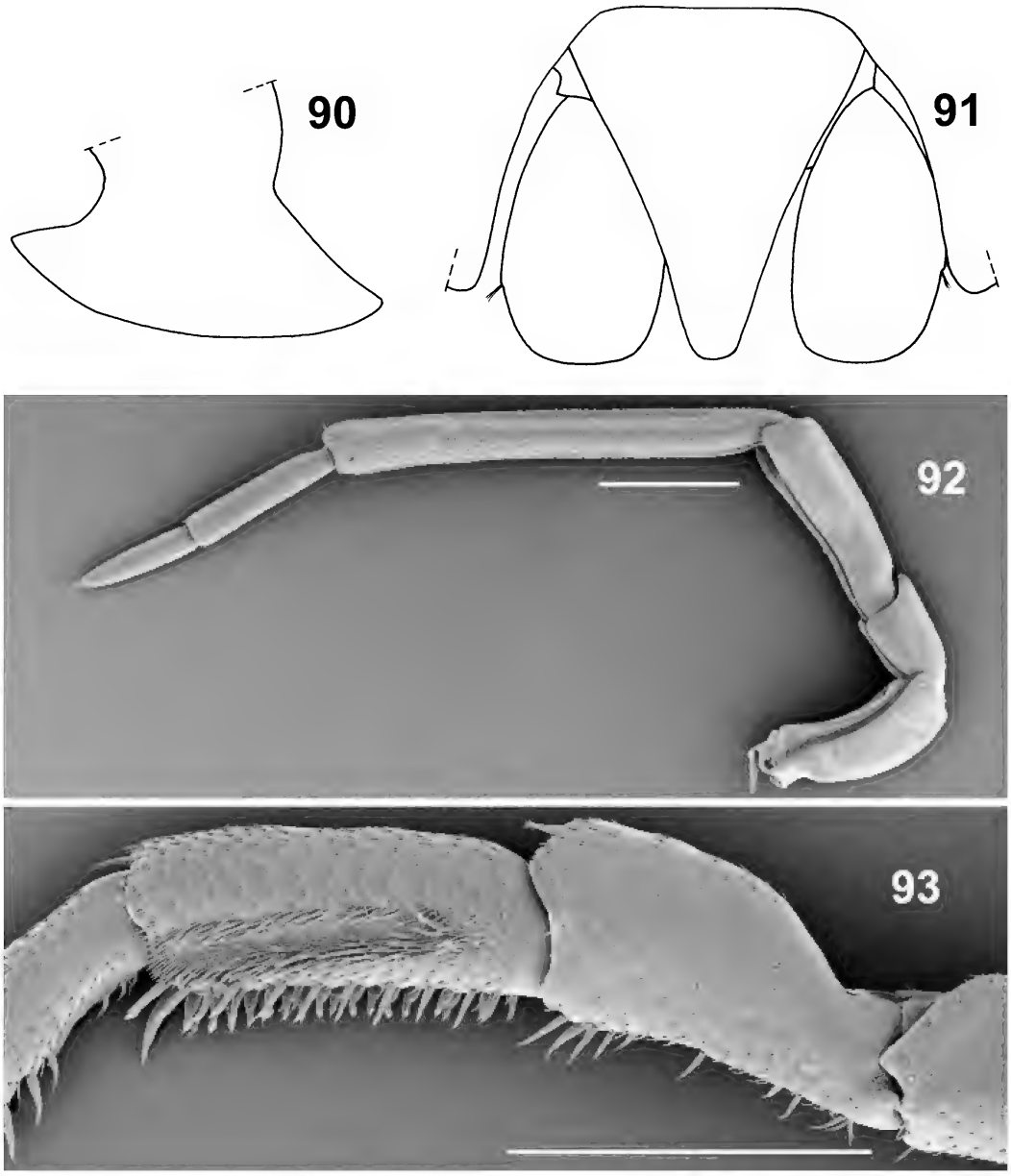
Coloration: Grey to blackish grey, with inconspicuous muscle-spots. The specimens from Bari (eastern Italy) are yellow without any dark pigmentation.



Figs. 88–89. *Armadillidium peraccae*, ♂, 18 mm long (Greece, northern Aegean island Thásos, SMNS 2592). – **88.** Pereion-tergite 1, lateral part with nodulus lateralis (arrow). **89.** Detail with nodulus lateralis. – Scales: 0.5 mm (88), 0.1 mm (89).

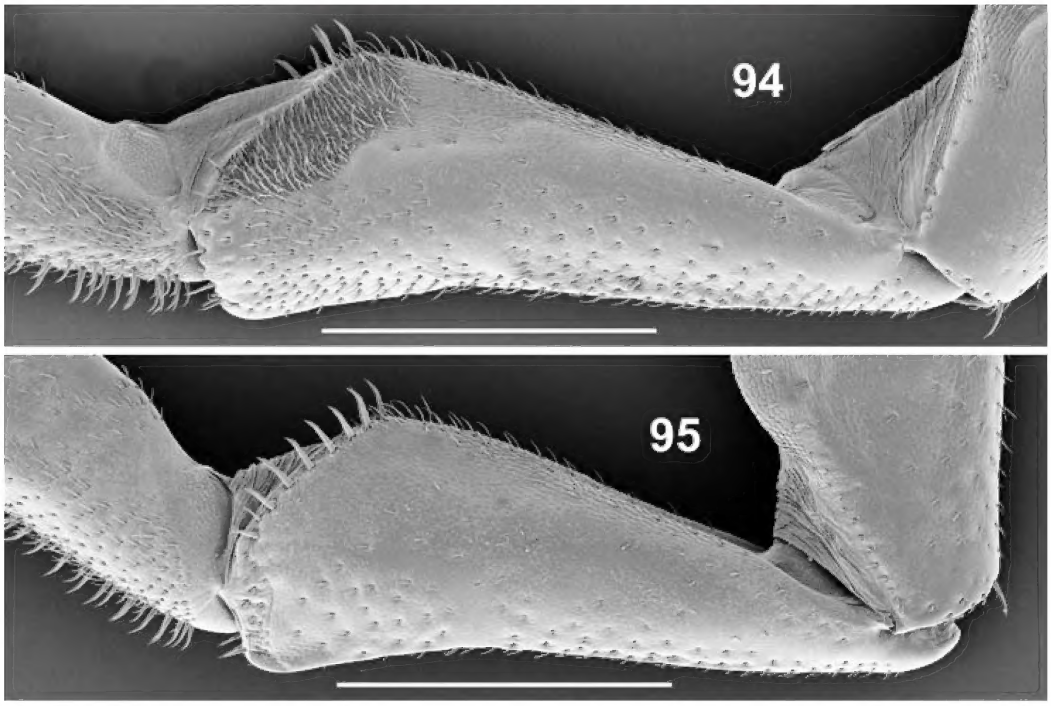
Cuticular structures: Tergites heavily tuberculated.

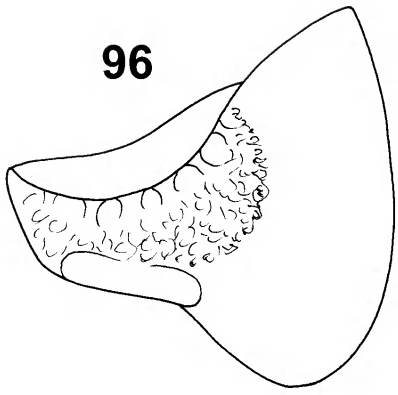
Frontal shield narrow, from behind as high as wide or slightly higher than wide, sides concave, dorsal margin wider than the middle part, with pointed angles laterally, caudally with conspicuous groove (Figs. 84–85); antennal lobes semicircular



Figs. 90–93. *Armadillidium peraccae*, ♂, 18 mm long (Greece, northern Aegean island Thásos, SMNS 2592). – **90**. Pereion-epimeron 1, dorsolateral view. **91**. Telson and uropods in situ, dorsal view. **92**. Antenna. **93**. Merus and carpus 1, frontal view. – Scales: 1 mm.

(Fig. 86). Hind margin of pereion-epimeron 1 with acute angle (Fig. 90), details of marginal parts of tergite 1 with nodulus lateralis see Figs. 87–89. Telson clearly longer than wide, with nearly straight sides and narrowly rounded apex (Fig. 91). Antenna see Fig. 92, distal segment of flagellum clearly shorter than proximal one. Male carpus 1 with brush of short spines (Fig. 93); male ischium 7 ventrally very slightly concave, frontally with distal hair-field (Figs. 94–95). Male pleopod-exopodite 1 with short triangular hind-lobe (Fig. 96), endopodite 1 with apex straight.





Figs. 94–96. *Armadillidium peraccae*, ♂, 18 mm long (Greece, northern Aegean island Thásos, SMNS 2592). – **94**. Ischium 7, frontal view. **95**. Ischium 7, caudal view. **96**. Pleopod-exopodite 1, dorsal view. – Scales: 1 mm.

Distribution

Southeastern coast of Italy, northern Aegean islands Thásos and Lésvos, coasts of the Marmara Sea.

In Fig. 83 the Greek records are mapped.

The reason for the distribution gap between the Adriatic coast and the Aegean and Black Sea records is unknown. The species could have been introduced from the Italian coast to the Aegean coasts or the other way round.

Remarks

A. peraccae differs from *A. pallasii* by heavily tuberculated tergal parts (in *pallasii* only moderately granulated), a frontal shield higher than wide with upper margin

wider than base (in *pallasii* wider than high with base wider than upper margin), a very pronounced angle on epimeron 1 (in *pallasii* an obtusely rounded angle) and a long telson with narrowly rounded apex (in *pallasii* with broadly rounded apex).

A. peraccae is a member of the *nasatum*-group, with the frontal shield morphology and the shape of telson and uropods as common derived characters (synapomorphies).

4.13 *Armadillidium vulgare* (Latreille, 1804) (Figs. 1–4)

This species was again treated in the 23rd contribution of this series (*Armadillidium* on the Peloponnese, SCHMALFUSS 2006). It originated with great probability in southeastern Europe and has been transported by human activities to all parts of the world, where it thrives mostly in disturbed biotopes where the indigenous fauna was destroyed together with the original vegetation for agricultural reasons. A map of all Greek records is given in SCHMALFUSS 2006.

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